Semester – I

Planning and Design Studio – I (PCC)								
Credit: 4				Evaluation Scheme (Weightages in %)				
Contact Hours per Week				Theory			Laboratory	
L	T	P	S	MSE	TA	ESE	ISE	ESE
0	0	8	0	--	--	--	50	50

	Course Outcomes
CO1	Students will be able to recognize different aspects of architectural building drawings and apply building design concepts in various architectural and planning projects.
CO2	Students will be able to interpret different types of maps related to the planning field.
CO3	Students will be able to apply concepts of graphics and presentation to prepare base maps at the site level.
CO4	Students will be able to apply Verbal and Non-verbal Communication Skills and Presentation Techniques in Planning.

Course Contents: Covers the basics of Graphics and Presentation Techniques of Planning

3D and 2D Representation Principles of orthographic projection, Orthographic Projection of Solids, architectural elements and built forms, Isometric and Axonometric views of solids and elements of built environment Representation in One point and two-point perspective, etc.
Concepts of Scales and Proportions Concept of scales and proportions; Graphic scales; Introduction to reduced scales and its application; Sketching as a Tool for Communication – Sketching of human figures, activities, natural and man-made elements; Measured Drawing of built elements – Streets and Street Features (Electric Poles, Trees, Bus Stop, other physical features)
Building Design Designing of Building, Building Elements – Plan, Section, Elevation; Horizontal and Vertical Circulation; Building Form, etc.
Map Reading Communicating with Map – Layout of Map, Map scale, Contour Interval, Grid Reference, Terrain Visualization, Topographical maps, Satellite imageries, and aerial photographs for thematic mapping, etc.
Base Maps and Key Maps Preparation of Base Maps and key maps at the levels of Site/Area, Generation of Theme Maps from Base Maps and Land Use Maps, Development of info-graphics, Demonstration of Uses of Statistical Data on Maps, Land Use Colors, etc.
Photography and its Application

Introduction to Photography, Reading visual images, the context of a photograph, photographs as evidence of reality, photography, and cities (National and International), advanced photography techniques, etc.

Reference Books:	
1.	Architecture: Form, Space, & Order, Frank D. K. Ching, John Wiley & Sons, 2014
2.	Architectural Drafting and Design by Alan Jefferis and David A. Madsen, Thomson Deimer Learning, NY, 5th Edition
3.	Rendering with Pen and Ink by Robert W. Gill. Thames and Hudson- Revised Edition
4.	Graphics for Urban Design by Bally Meeda, Neil Parkyn, and David Stuart Watson – Thomas Telford, Publishing London, 1979
5.	Building Drawing with an Integrated Approach to Built Environment by MG Shah, CM Kale, SY Patki, Tata McGraw Hill Education Pvt. Ltd., New Delhi, 5th Edition, 2017

Basics of Building Design and Construction (PCC)								
Credit: 3				Evaluation Scheme (Weightages in %)				
Contact Hours per Week				Theory			Laboratory	
L	T	P	S	MSE	TA	ESE	ISE	ESE
3	0	0	1	30	10	60	--	--

Course Outcomes	
CO1	Students will be able to differentiate types of building elements, buildings, and drawings
CO2	Students will be able to appraise rules, regulations, and principles of Building Planning
CO3	Students will be able to identify the requirements of site development and Building Services
CO4	Students will be able to interpret details of the structural components of building

Unit 1: Introduction to Building Elements Types of Structure, foundations, Footings, D.P.C., Flooring, Brick Masonry, Stone Masonry, Trusses, Roofing, Slabs, External Wall Sections with Details Plinth, Sills, Lintel, Doors and Windows, Parapets, Coping, Cladding Expansion Joints, Beams, Columns, Slabs, Lintels, Post, and Trusses, etc.	**6 Hrs.**
Unit 2: Types of Buildings and Drawings Types of Building Units – Bungalows, Twin Bungalows, Row Houses, Apartments; Requirements of Public buildings – Educational Buildings, Buildings for Health Care, Industrial Buildings, and Commercial Buildings. Types of	**6 Hrs.**

Drawing- Submission Drawing, Working Drawing, Architectural Drawing, etc.	
Unit 3: Buildings Planning: Definitions, Rule Regulation, Guidelines Definitions: Built-up Area, Floor Area, Carpet Area, Building Line, Control Line, FSI, Front Open Space / Margin / Setback, Habitable Room, Mezzanine Floor, Refuge Area, Stilt Floor, etc., Building Planning and Principles of Planning for Building, Integrated Approach in Built Environment. Horizontal Circulation and Vertical Circulation, Staircase etc.	**6 Hrs.**
Unit 4: Principles of Site Development Principles and components of site-development, setting out of buildings on site, Layout and construction of roads, service duct under the road, culverts, retaining wall, etc.	**6 Hrs.**
Unit 5: Introduction to Building Services Water and Waste Management Services and Systems; Water Supply Systems (sources, pumping, reservoirs, water treatment, tanks, pipe materials); standards for water; Sewerage and Sewerage Treatment Plants; Storm Water System; Rainwater Harvesting; Plumbing System, Fittings, and Fixtures; Measures for Effective Water Management, Drainage and Sanitation, etc.	**6 Hrs.**
Unit 6: Structural Components of Building Beams, types of beams, types of slabs, Column - short and long columns, spacing of columns, Design Principles of RCC beams and slabs. Construction System: reinforced concrete. Definition, Safe Bearing Capacity of soils, depths and widths of foundations, types of footings, etc.	**6 Hrs.**

Reference Books:	
1.	Handbook of Civil Engineering by R.N. Khanna, Engineer Publisher, New Delhi
2.	Principles of Building Drawings by M.G. Shah and C.M. Kale. Mac Millan India Ltd
3.	Building Construction by Dr. B. C. Punmmia, Laxmi Publications Ltd.
4.	National Building Code- 2015
5.	Shah M.G., Kale C.M. and Patki S.Y., "Building Drawing an Integrated approach to Built Environment", Tata McGraw Hill (Fifth edition)

Fundamentals of Planning (PCC)								
Credit: 3				Evaluation Scheme (Weightages in %)				
Contact Hours per Week				Theory			Laboratory	
L	T	P	S	MSE	TA	ESE	ISE	ESE
3	0	0	1	30	10	60	--	--

Course Outcomes	
CO1	Students will be able to demonstrate the importance of Urban Planning.
CO2	Students will be able to paraphrase fundamentals of Planning Theories and various theories of Urbanization.
CO3	Students will be able to explain Development Plans and Development Control Regulations, also various guidelines, and various land uses.
CO4	Students will be able to interpret various definitions of Planning, sources, and forms of Planning knowledge.

Unit 1: Definitions and Rationales of Planning Differentiating between Rural and Urban Areas, Concept of cities and various definitions, Governance Structure of Urban and Rural areas in India, Goals, and Objectives of Planning; Components of Planning; Benefits of Planning; Arguments for and against Planning, Fields of Planning – Urban, Regional, Environmental, Transport and Infrastructure, etc.	**6 Hrs.**
Unit 2: Land: its Importance and Management Land as a Resource, Salient Features of land as the Nucleus of Spatial Planning; Land Administration in India, Development of Land and Sustainability, etc.	**6 Hrs.**
Unit 3: Types of Spatial Plan Overview of Regional (District) Plan, Zonal Plan, Local Area Plan, Special Purpose Plan; Definition of Development Plan; Types of Development Plans; Master Plan, Structure Plan, District Plan, Action Area Plan, Town Planning Scheme, Regional Plan, etc.	**6 Hrs.**
Unit 4: Development Plans and Regulations Planning Advisory Group Report and the URDPFI Guidelines; Sector Plans and Spatial Plans; Defining Development and Development Control Regulations, Types of Development Control; Implications of Violations of Development Control Regulations; Conforming and Nonconforming Land Uses; Compatible and Non-Compatible Land Uses, and NIMBY, etc.	**6 Hrs.**
Unit 5: Governance of Planning Local Government in India; District Planning Committees and Metropolitan Planning Committees; Introduction to Internationalization and Globalization of Planning: Meanings and Forms of Globalization; Characteristics of a Global City; Principles for Planning for a Global City, etc.	**6 Hrs.**
Unit 6: Introduction to Land Use Theories Land Use Theories include Concentric Zone Theory; Sector Theory; Multiple Nuclei Theory and other latest theories; Core Periphery Theory; Succession and	**6 Hrs.**

Evolution theory; Gentrification, etc.	

Reference Books:	
1.	Fundamentals of Town Planning, G. K. Hiraskar, Dhanpat Rai Publications, 2012
2.	Town Planning in Ancient India, Binode Behari Dutt, Isha Books, 2009
3.	The City of Tomorrow and its Planning, Le Corbusier, Frederick Etchells (Translation), Dover Publications Inc., 2000
4.	URDPFI Guidelines (Volume I and II), Ministry of Urban Development, Government of India, 2015

Techniques of Planning (PCC)								
Credit: 3				Evaluation Scheme (Weightages in %)				
Contact Hours per Week				Theory			Laboratory	
L	T	P	S	MSE	TA	ESE	ISE	ESE
3	0	0	1	30	10	60	--	--

Course Outcomes	
CO1	Students will be able to differentiate spatial and non-spatial data collection, presentation, and interpretation in context for physical plan preparation.
CO2	Students will be able to analyze demographic and socio-economic data, using quantitative tools and techniques in the planning and implementation of various plans.
CO3	Students will be able to examine existing Urban and Regional Planning practices in India.
CO4	Students will be able to apply knowledge derived from the course to solve real-life problems.

Unit 1: Techniques of Preparation and Collection of Spatial Data for Base Map Base Map, Contents of Base Map, Different types of Plans, General Features of Base Map, Scale, type of Scales for Different Hierarchy of Plans, Layout Plans, etc.	**6 Hrs.**
Unit 2: Physical and Socio-Economic Surveys Data Requirements for Urban and Regional Planning, Sources and Methods of Primary and Secondary Data, Data Collection, Questionnaire Design, Sampling Techniques, Interview, Technique of Conducting Surveys for Land Use, Building Use, Height of Building, Density, Structural Condition of Building, Physical Features of Land, etc.	**6 Hrs.**
Unit 3: Graphical Presentation of Spatial and Non-Spatial Data	**6**

Tabulation of Data, Graphical Presentation of Data; Pie Diagrams, Histograms, Bar Charts, Normal, Semi-Log, Double Log Graphs and Their Uses; basic Disciplines of Illustration and Tables; Color, Black and White Presentation Techniques; Land Use Classification, Coding, and Analysis; Residential and Non-Residential Density Patterns and Analysis; Presentation of Spatial Data, Analysis, and Proposals, etc.	**Hrs.**
Unit 4: Methods of Analysis Methods of Analysis of Socio-Economic and Physical Data; Use of Techniques of Location Quotient, Coefficient of Localization; Locational Attributes of Activity and Population; Techniques for Understanding Structure of Urban Areas, Land Values and Density Patterns, etc.	**6 Hrs.**
Unit 5: Planning Standards Formulation of Spatial Standards for Residential, Industrial, Commercial, and Recreational Areas, Space Standards for Facility Areas, Utilities, And Networks; Population, Distance Criteria; Performance Standards; Case Studies, etc.	**6 Hrs.**
Unit 6: Plan Preparation and Advanced Techniques Setting of Goals and Objectives; Methodologies for preparation of urban/ regional development plans, master plans, structure plan and strategy plan techniques; plan implementation techniques; public participation and plan implementation; techniques of urban renewal and central area redevelopment, Thresholds analysis, retail location and industrial location analysis; intervening opportunity models; Gravity Models	**6 Hrs.**

Reference Books:	
1.	How to Conduct Survey, Arlene Fink, Sage, 2013
2.	How to Analyze Data, C.T. Fitz – Gibbon and L.L. Morris, Sage, 1987

Demography and Urbanization (PCC)								
Credit: 3				Evaluation Scheme (Weightages in %)				
Contact Hours per Week				Theory			Laboratory	
L	T	P	S	MSE	TA	ESE	ISE	ESE
3	0	0	1	30	10	60	--	--

Course Outcomes	
CO1	Students will be able to classify demographic processes, sources of data, data collection, data presentation and methods of analysis.
CO2	Students will be able to identify trends in human populations, compare causes and interrelations of demographic dynamics.
CO3	Students will be able to develop a basic understanding of demographic theory and its application to various aspects of urbanization and development.

CO4	Students will be able to critically analyze urbanization processes and policies and their contribution to economic growth and human wellbeing

Unit 1: Introduction and Sources of Demography Demography – Concept and Scope. Population trends, global variation in population size and growth, history of Population in India, Current Population Scenario, and Demographic profile of India and States. Sources of Population data - Population Censuses, Vital Registration, Sample Registration System and Large-scale Demographic Surveys - National Sample Surveys (NSS), World Fertility Survey (WFS), Demographic Health Surveys (DHS), Reproductive and Child Health Survey (RCHS). National Family Health Surveys (NFHS)	**6 Hrs.**
Unit 2: Measures of Population and population projection Fertility – Basic concepts, indicators of fertility, measures of fertility ASFR, TFR, CBR, GFR, Mortality – Basic concepts, indicators of mortality, measures CDR, IMR, ASDR, Trends and Fertility Differentials in India and internationally (rural-urban, education, religion), Migration – Basic concepts, determinants of Migration, Internal and International migration, measures of migration- Net migration, gross migration. Population Projection methods: Arithmetic, Geometric, Incremental, Graphical and growth rates, etc.	**6 Hrs.**
Unit 3: Population Composition and Change Population Composition and structure: Age-sex composition, dependency ratio, literacy level- Global and Indian Trends, Spatial and temporal changes in the size and distribution of population-global perspective with focus on India; Age and sex structure of population in developed and developing countries; Demographic dividend, Sex-ratio, Sex-ratio at birth, Child-Women ratio, Median Age, Age Sex Pyramid, Dependency Ratio (Child Dependency Ratio, Old Dependence Ratio, Total Dependency Ratio); Relationship between Population and Economic Development - views of Julian Simon, Simon Kuznets & Tragedy of commons, etc.	**6 Hrs.**
Unit 4: Measures of Urbanization Selected measures of concentration of population- arithmetic density, physiological density, and agricultural density, percentage distribution and dissimilarity index; Selected measures of Degree and tempo of urbanization - Primacy Index and Index of City Concentration, Percent Urban Growth and distribution of urban population, Lorenz curve and Gini's concentration ratio; Mean city Population Size, etc.	**6 Hrs.**
Unit 5: Urbanization in India Post-independence urbanization: urbanization process as influenced by socio-cultural, political, economic and administrative factors; industrialization and urban development. Concepts of rural-urban continuum and dichotomy; City-region relationship; structure of city regions, area of influence, dominance; rural-urban	**6 Hrs.**

fringes; its structure, stages of growth, its role in urban growth; urbanization,	
Unit 6: Policies and Strategies for Directing Urbanization Trends in India Basic issues in urbanization policy and role of national and state level policies; five-year plans, latest attempts at urbanization policy formulation in the country; Salient features of the report of the National Commission of Urbanization; Study of National Policies - National Urban Policy Framework (2018), Population and the Environment, Economy and Urbanization – Case studies.	**6 Hrs.**

Reference Books:	
1.	Bhende A.A. and Tara Kanitkar (2019)- Principles of Population Studies'- Himalaya Publishing House, Bombay
2.	K.B. Pathak, F. Ram (1998) Techniques of Demographic Analysis ' ISBN 13, 978-93-5367-824-1, Himalaya Publishing House, Bombay
3.	K. C. Sivaramakrishnan, Amitabh Kundu, B.N. Singh, (2007) Handbook of Urbanization in India
4.	Phadke V.S. &Swapna Banerjee Guha (Ed) (2007) - 'Urbanisation, Development and Environment' – Rawat Publication, New Delhi

Introduction to GIS and Computer Fundamentals (AEC)								
Credit: 3				Evaluation Scheme (Weightages in %)				
Contact Hours per Week				Theory			Laboratory	
L	T	P	S	MSE	TA	ESE	ISE	ESE
2	0	2	0	30	10	60	CIE: 100	

Course Outcomes	
CO1	Students will be able to define basics of computer fundamentals and applications.
CO2	Students will be able to summarize the concept of computer languages and the concept of database management.
CO3	Students will be able to infer advancement in the field of IT and its relevance with application in the Planning domain.
CO4	Students will be able to apply for and use of software applications such as CAD, GIS, Microsoft Office suite, etc.

Unit 1: Introduction to Computer Introduction to Basic block diagram and functions of various components of computer, Concept of Hardware and Software, Types of software, Compiler, and Interpreter. Introduction to computer programming, Basic Difference between Procedure Oriented Language and Object-Oriented Language, Introduction to program planning tools- algorithm, flowcharts, etc.	**6 Hrs.**

Unit 2: Application of MS Office Concepts and knowledge of words, Excel and power point presentations, data preparation and representation in the form of graphs, reports, presentations, posters etc. Application of MS office in planning, etc.	**6 Hrs.**
Unit 3: IOT, AI & ML in Urban Planning Sensors, Concepts and Definitions of The Internet of Things (IOT). History of IOT. Requirements, Functionalists and structure of IOT. IOT enabling technologies. Lighting as a service Intelligent Traffic system, Smart Parking, Smart water management IOT for smart cities. Concept of Artificial Intelligence and Machine learning, Case Studies of Applications of IOT, AI & ML in urban planning, Smart cities and development, etc.	**6 Hrs.**
Unit 4: Introduction to Computer-Aided Design (CAD) Introduction to drawing and drafting packages like AUTOCAD, Sketch up in planning. Application of CAD tools to create 2D and 3D models of cities and generate visualizations based on their designs. Concept of layers; scale, layouts, Application of CAD for plan preparation and documentation, heritage protection etc.	**6 Hrs.**
Unit 5: Introduction to GIS and Remote Sensing Introduction of GIS and evolution of Remote Sensing technology, Types of Data, Components of GIS, Raster and vector data, Concept of Projection Systems, Concept of Geo-referencing, Application of GIS in planning and various development sector case studies, etc.	**6 Hrs.**
Unit 6: Image Interpretation and Digitization Types of satellite & applications, Satellite Orbits, Concept of spectral & Electromagnetic radiations; Resolution, Aerial Photo interpretation, Qualitative and Quantitative elements of Photo interpretation; Principles of visual image interpretation; Image Classification, Introduction to Digital Image Processing; data, Data formats, Introduction to data conversions, Image corrections, meta data, scanning & annotations, etc.	**6 Hrs.**

Reference Books:	
1.	Computer fundamentals and Programming in C, Pradip Dey and Manas Ghosh, Oxford.
2.	The Internet of Things: How Smart TVs, Smart Cars, Smart Homes, and Smart Cities Are Changing the World.
3.	IoT Fundamentals: Networking Technologies, Protocols, and Use Cases for the Internet of Things by David Hanes.
4.	Essence of IoT - Fundamentals: Concepts and Insight by Dr. Snehal K Joshi.
5.	Introduction to Geographic Information Systems – Kang-Tsung Chang.
6.	P.A. Burrough and R. A. McDonnell, Principles of Geographic Information Systems, Oxford University Press, 1999.
7.	Bhatta, B. (3 Nov 2011). Remote Sensing and GIS (ISBN 019569239X,

	9780195692396 ed.). University of Minnesota: Oxford University Press, 2008.
8.	Rees, W.G., Physical Principles of Remote Sensing, Cambridge University Press, 2001.
9.	Lillesand T.M., And Kiefer R.M., Remote Sensing and Image Interpretation, Fourth Edition, Wiley, 1999.

Semester – II

Planning and Design Studio - II (PCC)								
Credit: 4				Evaluation Scheme (Weightages in %)				
Contact Hours per Week				Theory			Laboratory	
L	T	P	S	MSE	TA	ESE	ISE	ESE
0	0	8	0	--	--	--	50	50

Course Outcomes	
CO1	Students will be able to appraise an area in terms of land uses, administration, urban form, etc through primary physical surveys and secondary data.
CO2	Students will be able to represent the data through standard graphics, drawings, and photographs.
CO3	Students will be able to appraise knowledge of software for base maps, data entry, analysis, and multi-media presentations.
CO4	Students will be able to develop the ability to observe, record, map, and present different activities and spaces.
Pre-requisite: Planning and Design Studio - I	

Course Contents: Covers the basics of Survey and mapping to appraise a small area within the urban/ rural setting.

Base Map Preparation Prepare a base map of a chosen area (approximately 1 sq. km.) based on the satellite image. The representations of all components of Spatial Planning.
Introductory Survey Assignment Prepare survey questionnaires, conduct physical (field) and household/ user/ person surveys, compile data in tabular format, and basic analysis of the data.
Area Appreciation Appreciation studies of residential, commercial, and institutional areas in small urban and/or rural settlements; Data collection through site visits, surveys, and documentation; Graphic presentation of collected primary and secondary data; Preparation of base maps and key maps of the study area; Space Perception through study of areas with varying characters to appreciate the concepts of built form, activities, and people. Appreciate various elements of built form such as plot sizes, FAR, densities, building heights, and open spaces; Understand how built form supports various activities in different areas. Use Power Point and Multi-Media Projections.

Reference Books:	
1.	Qualitative Analysis for Planning and Policy by John Gaber and Sharon Gaber. Planner Press, APA 2007

Reference Books:	
2.	Fundamentals of land development by David and PE Johnson. John Wiley and Sons, 2008
3.	Community Analysis and Planning Techniques by Richard E Closterman. Rowman and Littlefield 1990

Remote Sensing and GIS (PCC)								
Credit: 3				Evaluation Scheme (Weightages in %)				
Contact Hours per Week				Theory			Laboratory	
L	T	P	S	MSE	TA	ESE	ISE	ESE
2	0	2	0	30	10	60	CIE: 100	

Course Outcomes	
CO1	Students will be able to appreciate the basics of Remote Sensing Fundamentals and Principles.
CO2	Students will be able to interpret image and data structure and coordinate systems.
CO3	Students will be able to define GIS System and components of GIS.
CO4	Students will be able to apply GIS in Planning and Planning Information System.

Unit 1: GIS Data and Advance Technology Introduction to data models and data structure, data representations, raster and vector data structure models, types of attribute data, Coordinate systems and Projection systems; GIS Database Management Systems, Map projections and transformation, ETS, GPS, DGPS, GNSS, CORS, PPK, RTK, Lidar, advancement of Drones (UAV) in mapping , Ground control points, GSD, GAGAN, NaVIC, Introduction to applications of Integration of AI & ML with GIS for decision making, etc.	**6 Hrs.**
Unit 2: Map Preparation Data digitization and Geo Referencing, Data format Conversions, Multiplatform data handling- Conversion of GIS data to CAD format and vis-a-vis; 3D Mapping techniques in Arc Scene, Cartography, working with shape files, Data Editing: Creation of Thematic Maps, Symbology, Arc Tool box, Spatial Selection and Spatial Query Building, Topology, Data Interpolation Techniques, Applications of GIS in Urban Planning, Transportation Planning, Hydrology, Utility Mapping & Infrastructure Planning, Disaster Management, Environment, Resource Management, etc.	**6 Hrs.**
Unit 3: Geo-Processing Tools Spatial and Non-Spatial Data: Spatial: Linking Features Attributes, Ways to View Data, Metadata, Non-Spatial data: Attribute Tables, Field Types, Table Manipulations, Table Relationship, Joins, Relates, Creation of Graphs and Reports Data Conversion – Vector to Raster, Raster to Vector, Adding Attribute Data – Querying on Attribute Data, Buffer, merge, union etc. Data Import, Processing and Mapping. Single Layer Operations: Feature Identification, Extraction,	**6 Hrs.**

Classification Manipulation. Multilayer Operation: Union, Intersection, Symmetrical Difference, Update, Merge, Append and Dissolve, etc.	
Unit 4: Digital Image Classification Spectral band classification: Supervised and Unsupervised Image Classification, LULC, Land suitability analysis, Training Sites Selection and Statistical Information Extraction, Discriminate Functions. Classifier: Maximum Likelihood, Euclidian Distance, Image Annotations, Introduction of Image processing in ERDAS Imagine, Arc GIS Pro and QGIS Plugging, etc.	**6 Hrs.**
Unit 5: Spatial Analysis and GIS Mapping Network Analysis: Network Utility, Creating Network Model, Shortest Path, Geo-coding, Surface Analysis: DEM, Presenting Data: Map Design, Map Composition Geosciences: Landform Analysis, Drainage Basin, Slope analysis, Integrated Approach for Landslide Hazard Zonation Models and Mapping. Water Resources: Watershed Hydrology, Physical Processes in Watershed, River Valley Project, Hydrological Modeling. Preparation of GIS based Base map, superimposing, map reconciliation, data conversion and compatibility, Preparation of existing land use, Land suitability analysis for site selection, etc.	**6 Hrs.**
Unit 6: Planning Information Systems in India Systems Approach to Planning as basis for Planning Information Systems; Systems, Hierarchy, Types; Data and Information, Value of Information, Information Flows, Loops; Information Security and Sharing; Information Systems, Types, Limitations. Planning Information Systems -NNRMS, NUIS, National Urban Observatory, Municipal Information Systems, Land Information Systems; Web and app-based Tools for Spatial Data Handling GIS based master plan preparation, Web GIS, Open layers, GIS Data & Satellite data repository, Government schemes, remote sensing a & GIS related policies & Case study, etc.	**6 Hrs.**

Reference Books:

1.	P.A. Burrough and R. A. McDonnell, Principles of Geographic Information Systems, Oxford University Press, 1999.
2.	Bhatta, B. (3 Nov 2011). Remote Sensing and GIS (ISBN 019569239X, 9780195692396 ed.). University of Minnesota: Oxford University Press, 2008.
3.	M. S. Nathawat, A. C. Pandey (Eds.) (2008) Geoinformatics for Decentralized Planning and Governance (ISBN: 813160117X), Rawat Publications
4.	Instructional Guide for The ArcGIS Book, second edition by ESRI
5.	The ArcGIS Book: 10 Big Ideas about Applying the Science of Whereby ESRI
6.	The ArcGIS Imagery Book: New View. New Vision *by ESRI*
7.	Michele Campagna GIS for Sustainable Development 2005 Taylor and Francis
8.	Planning and Management a Global Perspective Edited by Martin van Maarseveen, Javier Martinez, and Johannes Flacke
9.	GIS, Spatial Analysis, and Modeling, David J. Maguire, ESRI Press, 2005
10.	Applied Remote Sensing for Urban Planning Governance and Sustainability, Maik Netzband, Springer, 2013

11.	Remote Sensing and GIS: Theories, Methods, and Application, Weng Qihao, Mcgraw-Hill, 2010
12.	Paul Longley and Michael Betty Spatial Analysis – Modeling in GIS Environment 1996 John Wiley

Planning for Urban Utilities and Services (PCC)								
Credit: 3				Evaluation Scheme (Weightages in %)				
Contact Hours per Week				Theory			Laboratory	
L	T	P	S	MSE	TA	ESE	ISE	ESE
3	0	0	1	30	10	60	--	--

Course Outcomes:	
CO1	Students will be able to identify the objectives of urban utilities and services.
CO2	Students will be able to evaluate water treatment methods, their sequence, and associated benefits
CO3	Students will be able to analyze the case studies of waste management techniques
CO4	Students will be able to assess the implications of fire protection planning on land use

Unit 1: Introduction to Urban Utilities and Services Role of utilities and services in the development of urban areas, Role of Planner in provision of urban networks and services, Objectives of Utilities and Services, CPHEEO manual guidelines, URDPFI Guidelines, etc.	**6 Hrs.**
Unit 2: Water Supply Norms and standards of water supply, planning for water supply; source of supply, source analysis, quality and quantity; issues related to transmission of water, treatment methods, sequence, benefits; treatment plant location, distribution systems suitable in large city, small town; basic requirements, design guidelines; technological options for water supply; aspects of water distribution in far flung areas; standards and locations for pumping stations; water supply projects financing and management; legal rights, water pricing, water distribution systems in buildings and their design, significance and methods and advantages of water harvesting system, government initiative for water harvesting system, etc.	**6 Hrs.**
Unit 3: Sewage and Sanitation System Sewage: Sewage disposal methods and their advantages and disadvantages, quantity of sewage, Principles of sewage system layout, Different methods of sewage treatments; Issues related to development parameters. Collection, transportation and treatment of sewage; low-cost appropriate technologies for sanitation, standards for Indian cities, sanitary sewer system network and layout, procedure of planning, sewer appurtenances and master plan, case study of innovative approaches of sewage	**6 Hrs.**

disposal in urban area.	
Unit 4: Wastewater Management Characteristics of wastewater, description and analysis of the different factors that affect the quantity and quality of wastewater generated in urban environments; components and activities commonly used to assess and determine the wastewater quality and strength; review of typical wastewater compositions as a function of their origin and precedence; Industrial pollutants and their effects, Principles of the water bound disposal system, storm water drainage systems, etc.	**6 Hrs.**
Unit 5: Solid Waste Management Elements of solid waste management, classification and characteristics of solid wastes, on site collection, storage, transportation and disposal of solid wastes, processing and treatment of solid wastes, incineration, pyrolysis, land filling and cost aspects of different methods of solid waste, solid waste management issues in Indian Cities. Various social aspects of solid waste management, community participation and involvement of NGOs in efficient solid waste management, etc.	**6 Hrs.**
Unit 6: Fire Protection and Electricity Planning for fire protection services and space standards; Locational criteria, implications on land use and density. Planning for electrification, general scenario, services and space standards of transformers; load forecasting. Institutional arrangements for municipal services, sector issues and assessments, financing systems, administrative set-up, people's participation, etc.	**6 Hrs.**

Reference Books:	
1.	Infrastructure Planning Handbook by Alvin S. Goodman & Makarand Hastak
2.	Infrastructure Management by W. R. Hudson, R.C.G. Hass, W. Uddin
3.	Water Supply and Waste- Water Engineering by B S N Raju
4.	Central Public Health and Environmental Engineering Organization (CPHEEO) Manual
5.	URDPFI Guidelines (Volume I and II), Ministry of Urban Development, Government of India, 2015

Surveying (PCC)								
Credit: 2				Evaluation Scheme (Weightages in %)				
Contact Hours per Week				Theory			Laboratory	
L	T	P	S	MSE	TA	ESE	ISE	ESE
2	0	0	1	30	10	60	--	--

Course Outcomes	
CO1	Students will be able to recall the units, scales, and symbols in surveying.
CO2	Students will be able to demonstrate various methods of linear and angular measurements.
CO3	Students will be able to locate contour and appreciate the topography of a settlement uses and GPS in documenting spatial attributes of any location
CO4	Students will learn field applications of advanced surveying techniques.

Unit 1: Introduction to Surveying Basic Principles of Surveying; Measurement units, concepts of scales and conventional symbols; Stages in Surveying; Concept of Trigonometry; Traversing and Tacheometry in Surveying; Errors in Surveying	**5 Hrs.**
Unit 2: Primary Surveying Techniques Chain Surveying: principles and equipment; obstacles and errors in chaining; Types of Ranging; Errors and field application Compass Surveying: types of compasses; Concept of Bearing, magnetic declination; Effects of local attraction; Errors and field application, etc.	**5 Hrs.**
Unit 3: Conventional Surveying Techniques Plane Table Surveying: accessories, methods, advantages and disadvantages; Errors; Field application Theodolite Surveying: an overview Tachometric Surveying: an overview	**5 Hrs.**
Unit 4: Contouring and Levelling Contouring: Concept and Characteristics; Methods of Locating Contours; Uses of Contour Maps Levelling: Definitions, Methods, Types of Levelling Instruments; Temporary and Permanent Adjustments of Level; Theory of Direct, Differential and Reciprocal Levelling; Longitudinal Sectioning; Cross-Sectioning; Errors in Levelling; Field, Application Introduction to Digital Theodolite and application on field, etc.	**5 Hrs.**
Unit 5: Advanced Surveying Techniques Introduction to Total Station Survey and application on field; Introduction to GPS and application on field; Introduction to DGPS and its application on field; Introduction to Drone Surveying and its application, field mapping: Lider, GPR, Advantages & disadvantages of advanced surveying equipment's, etc.	**6 Hrs.**

Reference Books:	
1.	Duggal S. K. “Surveying Volume-I”, Tata McGraw-Hill Publishing Company Limited.
2.	Duggal S. K. “Surveying Volume-II”, Tata McGraw-Hill Publishing Company

Reference Books:	
	Limited.
3.	Basak N. N. "Surveying and Levelling", Tata McGraw-Hill Publishing Company Limited.
4.	Punmia B. C. "Surveying-I", Laxmi Publications (P) Ltd. New Delhi

Qualitative and Quantitative Methods of Planning (PCC)								
Credit: 3				Evaluation Scheme (Weightages in %)				
Contact Hours per Week				Theory			Laboratory	
L	T	P	S	MSE	TA	ESE	ISE	ESE
3	0	0	1	30	10	60	--	--

Course Outcomes	
CO1	Students will be able to extract and interpret Data
CO2	Students will be able to illustrate Probability and Data Sampling.
CO3	Students will be able to interpret Statistical Analysis.
CO4	Students will be able to articulate Forecasting and Time Series Analysis.

Unit-1: Data Collection and Presentation Data Collection: Primary and Secondary Sources of data, Survey Design, sources of various data in India, Data Presentation: Classification of Data, Tabulation of Data, Charting of Data, Choice of Suitable Diagrams, etc.	**4 Hrs.**
Unit-2: Data Analysis Measures of Central Tendency: characteristics of a Good Average, Arithmetic Mean, Median, Mode, Geometric Mean and Harmonic Mean, etc. Measures of Variation: Significance of Measuring Variation, Methods of Studying Variation, Average Deviation, Standard Deviation, etc.; Skewness, Moments, and Kurtosis: Measures of Skewness, Moments, Kurtosis, etc.	**6 Hrs.**
Unit-3: Probability and Data Sampling Probability: Types of Probability, Random Variable, Probability Function, Sampling: Purpose and Principle of Sampling, Methods of Sampling, Size of Sample, Merits and Limitations of sampling, Sampling Distribution, etc.	**6 Hrs.**
Unit-4: Statistics Correlation Analysis: Significance, Correlation & Causation, Types of Correlation, Methods of Studying Correlation, Multiple Correlation, etc.; Regression Analysis: Difference between Correlation and Regression, Linear Bivariate Regression Model, Regression Lines, Equations, Coefficients, etc.; Index Numbers: Use of Index Numbers, Unweighted Index Numbers, Weighted Index Numbers,	**8 Hrs.**

Quantity Index Numbers, Volume Index Numbers, Test for Perfections, etc.	
Unit-5: Forecasting, Linear Programming and Hypothesis Testing Forecasting: Introduction, Steps in Forecasting, Methods of Forecasting, etc.; Time Series Analysis: Components of Time Series, Straight Line Trends, Non-Linear Trend, etc. Linear Programming: methods for maximizing, methods for minimizing, etc.; Input-Output Analysis; Hypothesis Testing: The Chi ($\chi 2$) Test, The Z-Score Test, The T-Test, Test for Proportion, etc.	**6 Hrs.**
Unit-6: Introduction to Qualitative Research Quantitative vs. Qualitative Research; Importance and Use of Qualitative Research; Dominant paradigms of Qualitative Research - Interpretivist Thinking, Verstehen, Constructivism, Critical Theory, Introduction to Qualitative Inquiry - Ethnography, Grounded Theory, Participatory Action Research, etc.; Methods of Collecting and Analyzing Empirical Materials, Analyzing Talk and Text - Transcription, Domain and Theme Analysis, Focused Coding Data Management and Analysis Methods, Software and Qualitative Research, etc.	**6 Hrs.**

Reference Books:	
1.	Connor, L. R. and Morreu, A J H (1964): Statistics in Theory and Practice, Pitman, London
2.	Kruckeberg and Silvers (1974): Urban Planning Analysis: Methods and Models, John Wiley & Sons, New York
3.	Mode, E B (1961): Elements of Statistics, Prentice Hall, New Jersey Naiman, Rosenfeld, Zirkel (1972): Understanding Statistics, McGraw Hill, USA
4.	Wonnacott and Wannacott (1969): Introductory Statistics, John Wiley & Sons, New York
5.	Willams, Ken (ed) (1975): Statistics and Urban Planning, Charles Knight & Co. Ltd, London
6.	Yamane, Taro (1964): Statistics – An Introductory Analysis, Harper, New York
7.	Gupta S. P. and Gupta M. P. (2005), Business Statistics, Sultan Chand & Sons, New Delhi.

Surveying Lab (VSEC)								
Credit: 2				Evaluation Scheme (Weightages in %)				
Contact Hours per Week				Theory			Laboratory	
L	T	P	S	MSE	TA	ESE	ISE	ESE
0	0	4	1	--	--	--	50	50

Course Outcomes	
CO1	The students will be able to conduct measurements in horizontal and vertical plane

CO2	Students will be able to contribute to conducting scientific measurements and compute the area of the sites before commencement of actual project
CO3	Students will be able to plot and measure on site with the help of different methods of survey
CO4	Students will be able to apply advanced surveying equipment for preparation of Maps and Plan

Experiment	**Name of Practical**
1	Measurement of distance by Ranging and Chaining.
2	Determination of area of polygon given by chain & cross-staff survey.
3	Measurement of bearings of sides of traverse with prismatic compass and computation of correct included angle.
4	Locating given points or building by plane table surveying
5	Three-point problem in plane table surveying.
6	Measurement of area on paper with planimeter
7	Measurement of horizontal angles Theodolite
8	Measurement of vertical Angles with Theodolite
9	Determination of elevation of various points with auto level by height of Instrument Method and Rise & Fall Method.
10	Preparation of Contour Map for small area
11	To study Total Station and its uses
12	To locate point using DGPS Receiver
13	To study Drone and its uses

Reference Books:	
1.	Surveying (Volume I and II) by B.C. Purnia. Laxmi Publications, Delhi, 2005 2. .
2.	Digital Photogrammetry by Wilfried Linder. Springer Publishers 2008
3.	Advanced Surveying: Total Station and Remote Sensing. Pearson Publishers- 2007 3
4.	Punmia B. C. “Surveying-I”, Laxmi Publications (P) Ltd. New Delhi

Indian Knowledge System (HSMC)								
Credit: 2				Evaluation Scheme (Weightages in %)				
Contact Hours per Week				Theory			Laboratory	
L	T	P	S	MSE	TA	ESE	ISE	ESE
2	0	0	1	CIE: 100			--	--

Course Outcomes	
CO1	Students will be able to appreciate the major factors influencing human settlements development
CO2	Students will be able to relate the contextual nature of civilizations across the globe

CO3	Students will be able to learn the historicity of Indian Knowledge System and the broad classification of Indian philosophical systems.
CO4	Students will be able to highlight Key features of ancient texts and appreciate the key role it has played in the advancement of Town Planning domain

Unit 1: Evolution of Settlements and Cities Relevance of the study of Evolution; Preconditions for Urban Growth – The three revolutions in the history of humankind. Geographical, Social, political, and economic context of birth, rise and growth of settlements. Effects of cultural influence on physical form,	**6 Hrs.**
Unit 2: Cities Around the World Timeline for development of settlements and cities across the world. Ancient river valley civilisation, Medieval, renaissance, industrial and post-industrial cities; Stages of urban development- re-urbanisation, counter urbanisation, suburbanisation, Ex urbanisation.	**6 Hrs.**
Unit 4: Planning in Indian Knowledge System Literary sources of Ancient Knowledge, Definition of IKS, Unique aspects of IKS, The Vedic corpus, Broad contents of IKS with respect to architecture and planning, the text of Mayamata and Mansara, Geography of Bharatvarsh and Civilization Journey	**6 Hrs.**
Unit 5: Cities in Ancient India Town Planning Principles in Ancient India, Urban Planning and Management as given by Kautilya, Measurement system in Vedic India, Unitary buildings and religious buildings in Ancient India, Water Management & Transportation in Ancient India, Rainwater Harvesting System: Vav, Kund, Talav etc, Sacred Ecology, Continuity of Traditional Town Planning of Indian Cities - Jaipur, Madurai, Srirangam	**6 Hrs.**

Reference Books:	
1.	Mahadevan, B., Bhat Vinayak Rajat, Nagendra Pavana R.N. (2022), "Introduction to Indian Knowledge System: Concepts and Applications", PHI Learning Private Ltd. Delhi.
2.	A.E.J. Morris, History of Urban Form Before the Industrial Revolution (2017), Routledge
3.	G. P. Singh, Republics, Kingdoms, Towns and Cities in Ancient India (2003), D.K. Print World Ltd
3.	Bruno Dagens, (2017), 'Mayamata: An Indian Treatise on Housing Architecture and Iconography (An Updated Edition with revised Glossary)'
4.	Acarya, P.K. (1996). Indian Architecture, Munshiram Manoharlal Publishers, New

Reference Books:	
	Delhi.

Semester – III

Planning and Design Studio – III (PCC)								
Credit: 4				Evaluation Scheme (Weightages in %)				
Contact Hours per Week				Theory			Laboratory	
L	T	P	S	MSE	TA	ESE	ISE	ESE
0	0	8	0	--	--	--	50	50

Course Outcomes	
CO1	Students will be able to plan neighbourhood-level maps and working drawings of apartment units.
CO2	Students will be able to invent physical feasibility analysis at the site level and financial feasibility of the whole project.
CO3	Students will be able to develop various concepts concerning designing the site at the neighbourhood and township levels.
CO4	Students will be able to apply the basics of neighborhood planning through processes of experiential learning.
Prerequisite: Planning and Design Studio – I and II	

Course contents: Covers the Designing and Site Planning of layout at a neighbourhood scale.

Designing, Preparation, and Presentation of Drawings Design and preparation of plan, sections, and elevation of low-rise and high-rise apartments, considering the building byelaws and zoning regulations; Preparation of presentation drawings.
Planning Working Drawings Introduction to the working drawings; Preparation of plans, sections, elevations, and important details of an apartment unit.
Site Analysis and Conceptual Approach to Site Planning Site analysis, development standards, and preparation of the design brief; various considerations for site layout and conceptual approach to site planning;
Layouts and Area Analysis Preparation of preliminary layout and area analysis; Final layout showing the circulation and basic infrastructure;
Costing and Preparation of Model Rough cost of the scheme and model preparation to an appropriate scale.

Planning Theory (PCC)	
Credit: 3	Evaluation Scheme (Weightages in %)

Contact Hours per Week				Theory			Laboratory	
L	T	P	S	MSE	TA	ESE	ISE	ESE
3	0	0	1	30	10	60	--	--

Course Outcomes	
CO1	Students will be able to collaborate on Evolution of Planning Theories
CO2	Students will be able to comprehend the Changes in Theory in Response to Changing Contexts and the Theory – Practice Gap
CO3	Students will be able to contextualize the Salient Features of Classical and Contemporary Planning Theories
CO4	Students will be able to compare methods of Community Participation and Advocacy Planning

Unit 1: Defining Planning Theory Various definitions of Town and Country Planning; Goals and Objectives of Planning; Components of Planning; Benefits of Planning; Arguments for and against Planning Definitions of Planning Theory including Theory of Planning, Theory in Planning and Theory about Planning; Ontology and Epistemology of Planning Theory; Planning Theory: Definition and Typology; the theory-practice gap; Role of Theory in Urban Studies, etc.	**6 Hrs.**
Unit 2: Basis of Planning Definitions, Planning as a Hierarchical Process, Systems Concept, Systematic Planning, Optimization, Planning as a Problem-Solving Process, Philosophy and Purpose of Planning; Justification of Planning, Essential Features of Planning, Ecological Perspective of Planning, the Scope and Meaning and Objectives of Planning; Town Planning as a Practice, Profession and Discipline; the Nature of Town Planning Problems; Development of Planning Thought, etc.	**7 Hrs.**
Unit 3: Evolution of Planning Theories Paradigm Shifts in Planning Theory with time and context; Land Use Theories of Urban Structure; Transition to Socially based theories and Urban Ecology- Chicago School; Socialist Planning, Capitalist Planning and Mixed Economy Planning Responses; Pluralism and Advocacy Planning; Postmodern Planning; Collaborative Planning- Communicative Rationality; Planning as a Communicative Process, etc.	**6 Hrs.**
Unit 4: Classical and Contemporary Planning Theories An overview of Contemporary Theories on Urban Planning (William Alonso, David Harvey, Herbert Simon, Paul Davidoff, Christopher Alexander, Jane Jacobs, Alan Turner, Peter Calthorpe, Saskia Sassen, Manuel Castells, Ananya Roy); City as a Right to City, Global City, Network City, Systems Approach, etc.	**6 Hrs.**

Unit 5: Perspectives in Planning Scientific Rationalism and Planning, Systems View of Planning with a focus on Contributions of J. B. Mcloughlin and Others; Chief Characteristics of Comprehensive Rational Planning Model and Implications for Planning Practice; Systemic Change, Advocacy Planning, Pluralism and Equity Planning, Major Components of Advocacy, and Equity Planning Model; Implications on Role of Planners in Planning Practice, etc.	**6 Hrs.**
Unit 6: Participatory Planning Public Interest and its Forms, Participatory Planning: History and Significance, Methods of Public Participation; Institutional Arrangement for Public Participation, Impediments to Public Participation and Conditions for Effective Public Participation, Public Participation and Empowerment, Participation, Policy Formulation, and Implementation; Collaborative and Communicative Planning, Capabilities Perspective, etc.	**6 Hrs.**

Reference Books:	
1.	Planning Theory by A. Faludi. Pergamon Press, Oxford
2.	A Ladder of Public Participation by S. Arnstein. JAIP
3.	Taylor Nigel, Planning Theory since 1945, SAGE Publications, London
4.	Finche, R. and Planning for Diversity First Palgrave Macmillan, London. Iveson, K.
5.	Urban Planning Theory Since 1945 by N. Taylor, Sage publications, London
6.	Faludi, A. A Reader in Planning Theory - Pergamon Press, Oxford.
7.	Feinstein, S.S. and Readings in Planning Theory - Mackwell. Campbell, S.
8.	McLoughlin, J.B. Urban and Regional Planning: - Faber and Faber, London. A System Approach
9.	Hall, P. Urban and Regional Planning Fourth Routledge, London.
10.	Faludi, A. Planning Theory - Pergamon Press, Oxford.

Traffic and Transportation Planning - I (PCC)								
Credit: 3				Evaluation Scheme (Weightages in %)				
Contact Hours per Week				Theory			Laboratory	
L	T	P	S	MSE	TA	ESE	ISE	ESE
3	0	0	1	30	10	60	--	--

Course Outcomes	
CO1	Students will be able to relate the relationship between urbanization and the demand for transportation services.
CO2	Students will be able to connect relationships between speed, flow, and density in

	traffic.
CO3	Students will be able to analyze the road and intersection hierarchy and design elements.
CO4	Students will be able to apply design principles in traffic signal designs and parking facilities.

Unit 1: Transport System and its Development Urbanization and transport demand, motorization trends Evolution of Transport system, Economic, political and social significance and transport development, Role and importance of transport, characteristics in various forms of transport systems - road, rail, air, water; Transport policies and programs in India before and after independence, Classification	**6 Hrs.**
Unit 2: Fundamentals of Traffic Flow Basic components of traffic flow, Road user and vehicle characteristics, Fundamental parameters and relations, Concept of PCU and level of service, capacity of uninterrupted flow conditions, factors affecting capacity and level of service; capacity of rural and urban roads	**6 Hrs.**
Unit 3: Traffic and Transportation Surveys Study area definitions, surveys and their types, sampling of travel methods, survey techniques, design of proforma, methods of conducting surveys, analysis and interpretation, processing of travel data, analysis and interpretation of traffic studies. methods of conducting surveys, Road and network inventory, Traffic Volume Count, origin-destination survey, speed and delay study, parking surveys, pedestrian survey, public transport survey, Intermediate transport survey, Accident Studies, design of survey proforma, analysis and interpretation	**6 Hrs.**
Unit 4: Transport Facility Design Road: hierarchy, design control and criteria, Road Intersection Elements, geometric design elements, sight distance and control of access; Intersection: hierarchy of intersections, Intersection Design: Gap acceptance and capacity concepts, Uncontrolled Intersection: Capacity and LOS analysis, Traffic Rotaries and Grade Separated Intersection.	**6 Hrs.**
Unit 5: Traffic Management and Control Traffic Management measures; Arterial Management; Traffic Signs - principles, types and design considerations, road markings; Traffic Signals - types, optimal cycle length and signal settings, Traffic signal design: Design Principles of Traffic Signal, Evaluation of a Traffic Signal; Regulation of Traffic – speed regulation, regulation of vehicle	**6 Hrs.**
Unit 6: Public Transit and Non-motorized Transport Planning	**6**

Pedestrian Facilities: Capacity guidelines for at-grade and grade separated pedestrian facilities, design considerations. Cycling Facilities: Capacity guidelines and design considerations for cycle tracks Public Transport / Para Transit Facilities: Design standards for bus stops, auto rickshaw, taxi, cycle rickshaw stands, Parking: Parking space norms and standards, design standards for on-street and off-street parking facilities	**Hrs.**

Reference Books:	
1.	L. R. Kadiyali, Traffic Engineering and Transport Planning
2.	US Highway Capacity Manual
3.	INDO Highway Capacity Manual
4.	IRC Guidelines
5.	C. Buchanan, Traffic, and Design
6.	M. Taylor, W. Young, Bansal, Understanding Traffic systems
7.	Home Gurger, Transport Engineering Handbook
8.	Ortuzar, J. D., Willumsen, L. G., Modelling Transport (4th edition), John Wiley & Sons, 2011
9.	S.K. Khanna and C.E.G. Justo, Highway Engineering, Khanna Publishers, Roorkee, 2001

Geo-Informatics (OE)								
Credit: 2				Evaluation Scheme (Weightages in %)				
Contact Hours per Week				Theory			Laboratory	
L	T	P	S	MSE	TA	ESE	ISE	ESE
2	0	0	1	30	20	50	--	--

Course Outcomes:	
CO1	Students will be able to appraise various tools available in GIS to map large data.
CO2	Students will be able to relate different techniques of advanced geo-spatial analyst.
CO3	Students will be able to analyze the data and use GIS applications.
CO4	Students will be able to evaluate and apply real world applications of GIS tools and techniques for decision making & decision support system.

Unit 1: Data creation & Conversion Introduction to Image Correction and Spectral Indices; Review of GIS & 3D Mapping Techniques; Geo-referencing, Review of Coordinate systems and Projection systems, Spatial Data Models, geo-processing tools and mapping techniques, raster data analysis; Multiplatform data handling- Conversion of GIS data to CAD format and vis-a-vis; 3D mapping techniques in Arc Scene.	**6 Hrs.**

Unit 2: Data analysis Remote sensors and platform; Spatial Analysis and Related Mapping Techniques Location Analysis: suitability analysis, vulnerability analysis, hotspot analysis, Application of near tool, shadow analysis; Identifying pattern: supervised and unsupervised classification, review of indices, Digital change detection; Spectral Vegetation Index, Land Use/Land Cover Mapping process, Hydrological modeling in GIS	**6 Hrs.**
Unit 4: Spatial data Processing Network analysis About network, creating network datasets, basic network analysis, creating multi-modal network dataset, advanced network analysis-shortest path method, best route, the utility network analyst. GIS Standards, QGIS; Plugins; Open-source consortium, Introduction to web GIS and Geo server, GPS error and DGPS	**6 Hrs.**
Unit 5: Geoprocessing Significance and type Attribute Query, spatial query; Vector based spatial data analysis. Raster based spatial data analysis; Buffer analysis, Data quality and sources of errors, Integration of RS and GIS data, Digital Elevation Model, Network Analysis in GIS, Suitability analysis, Data analysis and modeling in GIS– types of GIS modeling, Decision support systems. Integration of GIS and GPS Automation and Basic programming Model Builder: Creating a model in Graphical User Inter-phase (GUI), expanding capabilities; Introductory programming, urban informatics	**6 Hrs.**

Reference Books:	
1.	Concepts and Techniques of Geographic Information Systems by Chor Pang Lo; Prentice-Hall of India Private Ltd.
2.	Mastering ArcGIS by Maribeth Price; McGraw Hill.
3.	Lo C.P. and Yeung A.K.W., Concepts and Techniques of Geographic Information Systems, Prentice-Hall, Inc., NJ, 2002.
4.	Harsan Karimi (Ed.) (2009) Handbook of Research on Urban Informatics: The Practice and Promise of the Real-Time City. Information Science Reference, IGI Global, Hershey, Pa.
5.	Paul Longley and Michael Betty Spatial Analysis – Modeling in GIS Environment 1996 John Wiley

Environment Studies (VEC)								
Credit: 1				Evaluation Scheme (Weightages in %)				
Contact Hours per Week				Theory			Laboratory	
L	T	P	S	MSE	TA	ESE	ISE	ESE

1	0	0	1	CIE: 100		

Course Outcomes:	
CO1	Students will be able to discover the impact of urban areas on local, regional, and global biodiversity patterns.
CO2	Students will be able to comprehend the complexity and various forms and dimensions of development and environment issues.
CO3	Students will be able to critically reflect on their own learning about environment and development issues.
CO4	Students will be able to critically assess the politics of sustainability and the various theoretical perspectives of development and environment.

Unit 1: Approaches and debates to environment and development Introduction: Development, economic growth and sustainable development, Basic ecosystem ecology, Environmentalism, Approaches to environment-Ecofeminism, Feminist political ecology, Marxism and ecology. Debates on environmental ethics - Deep ecology, Gandhi and ecology, social ecology. Natural resource management, Common property vs. private property, Livelihoods, forests, and conservation	**6 Hrs.**
Unit 2: Displacement, Dispossession, and Development Conservation-induced displacement, Environment impact assessment and national rehabilitation & resettlement policy, Dispossession and land acquisition. Competing visions of development along the Narmada, Dams, development, and resistance: case studies. Strengthening or weakening of indigenous peoples: Mining, development, and indigenous people,	**6 Hrs.**
Unit 3: Belief and Knowledge Systems Environment and climate change: Climate change interventions and policy framework. Global Environmental Issues – Biodiversity loss, Climate change, Ozone layer depletion; Sea level rise. Case studies on climate change in Indian context- Himalayas, conservation of nature in Northeast India. Local knowledge in the environment-development discourse: Indigenous knowledge.	**6 Hrs.**

Reference Books:	
1.	Arnold, David and Guha, Ramchandra, (eds.), 1997. Nature, Culture and Imperialism, New Delhi: Oxford University Press.
2.	Bicker, Alan, Paul Sillitoe and Johan Pottier. 2004. Development and Local Knowledge: New Approaches to Issues in Natural Resources Management, Conservation and Agriculture. Routledge, London & New York.
3.	Gadgil, Madhav and Guha, Ramchandra. 1995. Ecology and Equity: The use and

Reference Books:	
	Abuse of Nature in Contemporary India, New Delhi: Oxford University.
4.	Merchant, Carolyn. 1994. Ecology: Key Concepts in Critical Theory, Humanities Press, New Jersey.
5.	Environmental concerns and sustainable development: some perspectives from India, Salagrama Somayaji, TERI.

Land Economics (HSMC)								
Credit: 2				Evaluation Scheme (Weightages in %)				
Contact Hours per Week				Theory			Laboratory	
L	T	P	S	MSE	TA	ESE	ISE	ESE
2	0	0	1	30	10	60	--	--

Course Outcomes	
CO1	Students will be able to Construct Definition and Scope of Economics.
CO2	Students will be able to Correlate Theory of Firm Production & Economies of Scale.
CO3	Students will be able to Articulate Land Uses and Land Values.
CO4	Students will be able to Interpret Land Economics and Development Economics.

Unit-I: Definition and Scope of Economics Definition and Scope of Economics and its importance in Planning; types of Economics- Positive & Normative Economics, Classical & Non-classical Economics, Macro & Microeconomics, etc.; Concept of Market Demand & Supply, Time & Supply, Shift & Movement, Elasticity & Consumer Markets; Equilibrium and Disequilibrium of Economy; Economics and Social Costs; etc.	**6 Hrs.**
Unit-2: Theory of Firm Production Theory of Production; Factors of Production, Factor Immobility, Fixed Cost and Variable Costs, Consumer Goods & Capital Goods; Perfect Market Conditions, Pricing under different Market Conditions; Economics of Scale; Economics of Agglomeration & Economics of Conglomeration; Growth and Development Indicators; Measures of National Income; Defining Development and Under-development; etc.	**6 Hrs.**
Unit-3: Land Economics Cost, Price and Value of Commodity, Use Value & Exchange Value, Perfect Market Conditions; Concept of Pareto Optimality, Welfare Economics; Land Characteristics: Immobility, Divisibility, Modification, Non-standardized Commodity, etc.; Attributes of Land: Location, Area, Configuration, Permissibility, Restriction, etc.; Effect of Government Policies and Taxation on	**6 Hrs.**

Land as a Resource; Economic Principles in Land Use Planning; etc.	
Unit-4: Land Uses and Land Values Determination of Price of Land: Ricardian Theory of the Land Market, Agricultural Land Rent Theory by Von Thunen, Alonso's Bid Rent Function Theory, etc.; Approaches to Industrial Location Theory: Least Cost Approach, Market Area Analysis, Profit Maximization Approach, etc. Economic Development & Economic Growth - Definitions, Concepts, Characteristics, Comparisons, etc.; Measurement of Economic Development, Human Development Index, Poverty, Policies and Strategies in Economic Planning, etc.	**6 Hrs.**

Reference Books:	
1.	The Economics of Development and Planning by M. L. Jhingan, Vrinda Publications, Delhi
2.	Economics and Land Use Planning by Alan W. Evans, Balckwell Publishing, Oxford
3.	Urban Land Economics by Michael Goldberg and Peter Chinloy, John Wiley & Sons, USA
4.	Planning and Economics of Cities by Prasanna K. Mohanty
5.	Industrial Locations – Principles, Practice and Policy by J. W. Harrington and Barney Warf, Routledge Publications, London
6.	Urban Economics by Arthur O'Sullivan, McGraw-Hill International Education, Singapore

Semester – IV

Planning and Design Studio - IV (PCC)								
Credit: 4				Evaluation Scheme (Weightages in %)				
Contact Hours per Week				Theory			Laboratory	
L	T	P	S	MSE	TA	ESE	ISE	ESE
0	0	8	0	--	--	--	50	50

Course Outcomes	
CO1	Students will familiarize basic understanding of transport supply, demand, and infrastructure performance through live projects.
CO2	Students will be able to work in teams and articulate coordination and implementation of various types of Traffic surveys
CO3	Students will be able to analyze and conclude the traffic issues of an area using various transportation and traffic techniques
CO4	Students will acquire skills that will contribute to the preparation of traffic-management plans, area circulation plans, parking management plans, Comprehensive Mobility Plans
Prerequisite: Planning and Design Studio - III	

Course Contents: Focuses on the application of Basic concepts and analysis techniques of Traffic and Transportation

Transport Infrastructure Supply Assessment: Understand the road cross-sectional elements of roads and their relationship with abutting land-use and the effect of encroachment of transport supply infrastructure, Street furniture, road markings, road signage, functional and geometrical/physical classifications of urban roads, and their cross-sectional elements. Junction hierarchy.
Transport Infrastructure Demand Assessment: Carry out the Traffic volume count, Household and Roadside Origin –Destination, parking, and public transport surveys. Pedestrian survey.
Transport Infrastructure Quality Assessment: Carry out the speed & delay survey, signalized intersection survey, and surveys of different road users (NMT, Public Transport, Private mode users).
Gap and Issues Identifications Through Transport infrastructure supply, demand, and quality assessment, Issues will be identified for all transport infrastructure users like non-mortised, public transport and private users
Short Term -Traffic Management Plan Based on Identified Users Issues, a Traffic management plan will be prepared for the case study area, which will include geometric redesign, circulation pattern, parking

management schemes, new signal phasing for junctions, etc.

Reference Books:	
1.	L. R Kadiyali, Traffic engineering and transport planning
2.	C. Jotin Khisty and B. Kent Lall , Transportation Engineering, Pearson Publication
3.	M. Bruton, Introduction to Transport Planning
4.	Salter, Analytical Transport Planning
5.	OECD, Better Towns with less traffic
6.	Indian Road Congress Code SP- 041
7.	Indian Road Congress Code 103-2012
8.	Indian Road Congress Code SP- 012
9.	Indian Road Congress Code 86-2018

Sociology and Geography (PCC)								
Credit: 2				Evaluation Scheme (Weightages in %)				
Contact Hours per Week				Theory			Laboratory	
L	T	P	S	MSE	TA	ESE	ISE	ESE
2	0	0	1	30	10	60	--	--

Course Outcomes	
CO1	Students will be able to correlate Sociology and its relevance to Planning
CO2	Students will be able to judge Social Institutions, Social Stratification, and Community Development.
CO3	Students will be able to assess Geography and its relevance to Planning
CO4	Students will be able to analyze the Process of Urbanization, Settlement Geography, and Urban Geography.

Unit-1: Definition and Scope of Sociology Definition of Sociology, Nature of Sociology, Importance of Sociology; Three Major Theoretical Perspectives of Sociology, Sociological Concepts and Methods; Urban Sociology – Chicago School of Urban Sociology, Man and Environment Relationships, Social Groups – Primary, Secondary, etc.; Urban Sociological Theories – Marx & Engels, Tonnies, George Simmel, Max Weber, etc.; Components of Population -Population Composition, Population Growth and Projection; etc.	**6 Hrs.**
Unit-2: Social Institution and Social Stratification Social Institution - Family, kinship Pattern and Authority; Urban Ecology, Urban Family, Cultural Aspect of Urban Life, Social Aspect of Urban Life; Urbanization	**6 Hrs.**

and Industrialization, Social Consequences of Urbanization - Urban Issues, Urban Problems, Urban Juvenile Delinquency, etc.; Social Structure and Social Control; Urban Stratification, Status and Mobility; Social Inequality and Social Defiance; Social Structure and Spatial Planning; etc.	
Unit-3: Community Development Urban and Rural Social Transformation and their impact on Social Life; Development Induced Displacement – Redevelopment, Resettlement and Rehabilitation, Social Problems of Slums and Squatters Communities; Gender Sensitivity - Gender Implications on Spatial Planning; Safety, Security, Crimes in Urban Areas and their Spatial Planning Implications; Social Planning and Policy; Community Participation, Voluntary Association, Marginalization and Concepts of Inclusive Planning; National Commission on Urbanization; etc.	**6 Hrs.**
Unit-4: Study of Urban Geography Definition and Scope of Urban Geography; Aspects and Trends of Urban Geography; Location of Cities; Process of Urbanization - Facts and Causes of Urbanization; Urban Places- Central, Periodic and Disperses - Central Place Theory; Rank Size, Guttman Scale, Functional Centrality Index, Zipf's Law; Primate City, etc.; Hierarchies, Spheres of Influence and Urban Systems; Form and structure of Cities; Nature of Cities; etc.	**6 Hrs.**
Unit-5: Settlement Geography The Geographer and Settlements; Rural & Urban Population; Villages and Towns, Towns and Cities; Villages and Hamlets; Subject Matter of Settlement Geography; Methods of Settlement Study; Distribution and Pattern of Settlements; Growth of Town and Cities; Town Sites and Situations; Million Cities and Conurbations; Population Structure of Towns; Urban Function and Town Classification; etc.	**6 Hrs.**
Unit-6: Geography and Planning The Size and Spacing of cities; Internal Structure of Cities; Location of Economic Activities - Central Business District, Location of Industry; City and Region; Rural Settlement and Society; Urban and Rural Planning; Problems of Development; Problems Areas of the Cities, Urban Expansion- Urban Periphery and Suburbia; Changing Nature of Cities; City of the Future; etc.	**6 Hrs.**

Reference Books:	
1.	Sociology- Principles of Sociology with an Introduction to Sociological Thought by C. N. Shankar Rao, Published by S. Chand & Company, New Delhi
2.	The New Urban Sociology by Mark Gottdiener & Ray Hutchison, Published by Westview Press
3.	Urban Sociology by N. Jayapalan, Published by Atlantic Publishers & Distributers (P)
4.	Urban Social Geography – An Introduction by Paul Knox & Steven Pinch Published by Pearson

Reference Books:	
5.	The Study of Urban Geography by Harold Carter, Published by Arnold, London
6.	Economic and Social Geography Made Simple by R. Knowled & J. Wareing Published by Ahad Enterprises, Delhi

Traffic and Transportation Planning - II (PCC)								
Credit: 3				Evaluation Scheme (Weightages in %)				
Contact Hours per Week				Theory			Laboratory	
L	T	P	S	MSE	TA	ESE	ISE	ESE
3	0	0	1	30	10	60	--	--

Course Outcomes:	
CO1	Students will be able to articulate basics of urban form, land use and transport interactions
CO2	Students will be able to analyze the various stages of the transport planning process.
CO3	Students will be able to assess the financial viability and economic benefits of proposed projects.
CO4	Students will be able to evaluate the existing organizational and legal frameworks in transportation.

Unit 1: Urban Structure and Transport System Types of Urban Form and Structure, Impact of urban form and structure on transport system development, urban structure and mobility levels, concept of accessibility and mobility	**6 Hrs.**
Unit 2: Land use Transport Model Overview of Land Use-Transportation Modeling, Principles of Land Use-Transport Interaction, Land Use Modeling, TOD: Defining the Concept, Case studies, stakeholder engagement, regulatory support	**6 Hrs.**
Unit 3: Comprehensive Transport Planning Study area definitions, surveys and studies, survey techniques; and transport planning process – trip generation, trip distribution, modal split, trip assignment; land use transport models, Comprehensive Mobility Plan (CMP) Components, Case studies, etc.	**6 Hrs.**
Unit 4: Transport and Environment Traffic noise, air pollution - factors affecting, abatement measures, standards; Traffic Safety- accident reporting and recording systems, factors affecting road safety; Transport Planning for Target groups - Children, adults, handicapped and women; Norms and Guidelines for highway landscape; Street lighting type - standards and	**6 Hrs.**

design considerations	
Unit 5: Economic Evaluation Economic appraisal of transport projects, techniques for estimating direct and indirect road user costs and benefits and value of travel time. Transport Project feasibility project Case studies.	**6 Hrs.**
Unit 6: Transport Policy and Management Review of national, state and local level transport policies and their relevance in spatial and economic planning; pricing and funding of transport systems; energy and environment implications in transport; existing organizational and legal framework, transport co-ordination; Transport System Management (TSM) Plans	**6 Hrs.**

Reference Books:	
1.	L. R Kadiyali, Traffic Engineering and Transport Planning
2.	C. Jotin Khisty and B. Kent Lall, Transportation Engineering, Pearson Publication
3.	M. Bruton, Introduction of Transport Planning
4.	Salter, Analytical Transport Planning
5.	Chakroborty P., Das N., Principles of Transportation Engineering (2nd edition), PHI, New Delhi,2017
6.	Ortuzar, J. D., Willumsen, L. G., Modelling Transport (4th edition), John Wiley & Sons,2011
7.	Papacostas C. S. and Prevedouros, P. D., Transportation Engineering & Planning (3rd edition), PHI, New Delhi,2001
8.	Planning Commission (1980), Report of the National Transport Policy Committee, Govt. of India, 1980.
9.	Chakroborty P., Das N., Principles of Transportation Engineering (2nd edition), PHI, New Delhi,2017

Urban Infrastructure Planning (OE)								
Credit: 2				Evaluation Scheme (Weightages in %)				
Contact Hours per Week				Theory			Laboratory	
L	T	P	S	MSE	TA	ESE	ISE	ESE
2	0	0	1	30	20	50	--	--

Course Outcomes	
CO1	Students will be able to recognize the fundamentals of urban infrastructure planning.
CO2	Students will be able to relate to the mechanism of water supply and sewage

	sanitation services.
CO3	Students will be able to establish a link between urban development and infrastructure planning.
CO4	Students will be able to identify and interpret different shortcomings and challenges in the current practices.

Unit 1: Water Supply Concept of basic needs; formulation of objectives, norms, and standards; Planning for water supply; Source of supply, source analysis, quality, and quantity; Issues related to the transmission of water, treatment methods, sequence, benefits; Distribution systems suitable in a large city, small town; basic requirements, design guidelines; Technological options for water supply; Aspects of water distribution in far-flung areas; Water supply projects financing and management; water pricing, water pollution.	**6 Hrs.**
Unit 2: Sewage and Sanitation Biological/ Environmental/ Cultural concepts in environmental sanitation; Low-cost sanitation options: biogas, Sulabh Sauchalaya, etc.; Basic information, alternative disposal systems and conditions of use; Principles of sewage system layout; Collection, transportation, and treatment of sewage; Principles of water bound disposal system, stormwater drainage systems; Different methods of sewage treatments; Issues related to development parameters. Solid waste: basic principles, generation, characteristics, collection, collection, disposal, management of city waste; Environmental issues of garbage disposal; Alternative technological innovations, conversion of garbage into usable forms.	**6 Hrs.**
Unit 3: Social Infrastructure Planning for fire protection services and space standards; Locational criteria, implications on land-use and density. Planning for electrification, general scenario, services and space standards of transformers; Locational criteria, load forecasting, standards for education and health care facilities. Institutional arrangements for municipal services, sector issues and assessments, financing systems, administrative set-up, and people's participation.	**6 Hrs.**
Unit 4: Urban Development and Infrastructure Planning in India Urban development in India: problems and issues, policies, programs and provisions in the national five-year plans; processes of decision making for urban development at national, regional, state, district and local levels. (governance 3 tier structure, urban management tool). Challenges in the implementation of various infrastructure projects. Current provisions in terms of policies, programs, and initiatives.	**6 Hrs**

Reference Books:

1.	Central Public Health and Environmental Engineering Organization (CPHEEO) Manual
2.	Inclusive Planning and Social Infrastructure / A.K. Jain
3.	Infrastructure Planning Handbook / Alvin S. Goodman & Makarand Hastak
4.	Infrastructure Management/ W.R. Hudson, R.C.G. Hass, W. Uddin
5.	URDPFI Guidelines (Volume I and II), Ministry of Urban Development, Government of India, 2015

Basics of Information Technology and Programming (VSEC)								
Credit: 2				Evaluation Scheme (Weightages in %)				
Contact Hours per Week				Theory			Laboratory	
L	T	P	S	MSE	TA	ESE	ISE	ESE
2	0	0	4	--	--	--	50	50

Course Outcomes:	
CO1	Students will be able to interpret the fundamental concepts of Information Technology and its role in Urban Planning.
CO2	Students will be able to correlate the basics of Management Information Systems (MIS).
CO3	Students will be able to analyze different database systems.
CO4	Students will be able to apply the knowledge of programming in different aspects of Planning.

Unit 1: Introduction to Information Technology Introduction, Attributes of Information Technology, Elements of Information Technology, Purpose of Information System; Types of Information Systems, Tools for development of Information Systems, Maintenance and updating of information systems, ICT and its evolution, Importance of Technology for Data-driven Decision Making in Urban Planning, etc.	**6 Hrs.**
Unit 2: Data Management and Analysis Introduction to MIS, Functions of MIS, Different Components of MIS, MIS as an Integrated Application, Do's and Don'ts for developing MIS, Advanced Methods of communication with computer, Case studies of MIS in urban planning (Projects in India: E-governance, E-commerce etc.), Basics of Data Management in Urban Planning, Data Cleaning and Pre-processing Techniques	**6Hrs.**
Unit 3: Introduction to Programming Planning the Computer Program: Concept of problem solving, Problem definition, Program design, Debugging, Types of errors in programming, Documentation; Techniques of Problem Solving: Flowcharting, decision table, algorithms, Structured programming concepts, Programming methodologies viz. top-down and	**6 Hrs.**

bottom-up programming. SQL -What is database system, purpose of database system, view of data, relational databases, database architecture, transaction management, Introduction to SQL, Data models, working with relations of relational database management system	
Unit 4: Python Introduction to Python: Structure of a Python Program, Elements of Python, Python Interpreter, Using Python as calculator, Python shell, Indentation. Atoms, Identifiers and keywords, Literals, Strings and Operators, Branching, Looping, Conditional Statement, exit function, Difference between break, continue and pass. Defining a function, calling a function, Types of functions, Global and local variables, organizing python codes using functions. Writing and Executing Simple Programs, etc.	**6 Hrs.**

Reference Books:	
1.	Information Technology: Principles, Practices, and Opportunities" by Ramesh Bangia
2.	Management Information Systems: Managing the Digital Firm" by Kenneth C. Laudon and Jane P. Laudon
3.	Structured Computer Organization" by Andrew S. Tanenbaum.
4.	Database System Concepts" by Abraham Silberschatz, Henry F. Korth, and S. Sudarshan
5.	R Programming An Approach to Data Analytics by G Sudhamathy
6.	Introduction to Data Science: Practical Approach with R and Python by B. Uma Maheswari

Professional Practice and Ethics (VEC)								
Credit: 1				Evaluation Scheme (Weightages in %)				
Contact Hours per Week				Theory			Laboratory	
L	T	P	S	MSE	TA	ESE	ISE	ESE
1	0	0	1	CIE: 100				

Course Outcomes	
CO1	Students will be able to identify scopes for profession practice.
CO2	Students will be able to restate and analyze organizations, management of planning and development authorities.
CO3	Students will be able to comprehend & evaluate the roles and responsibility of practicing professionals.
CO4	Students will be able to practice professionally with morals and ethics.

Unit-1: Overview of Governance	**5**

Definition, Concepts, Components, Government and Governance; Hierarchy and Structure, Forms of Governance, Process of Inclusion and Exclusion; Legislations Pertaining to Governance Institutional Frame and Mechanism for Governance as envisaged in the 73rd and 74th Constitution Amendment Acts; Process of Decision Making, Implementation, Execution and Management; Functions and Powers and Structure and Funding Resources to the Local Government and their performance; etc.	**Hrs.**
Unit-2: Organization and Management Aims and Objectives of Professional Institutes, Differences between Institutions and Organizations; Approaches to Understanding Organizations; Types, Structure, and Functions, their Interface and Conflicts; Methods, Process and Evaluation; Personnel Management, Manpower Planning, Performance Appraisal; Motivation, Monitoring and Improvement in Moral; Role In Inter-Disciplinary Groups: Appreciation of the Decision-Making Processes and the Process in Relation to Varied Consultancy Assignments of Planning; etc.	**5 Hrs.**
Unit-3: Professional Practice Professional Role and Responsibility of Planning Consultants; Professional Values, Morals and Ethics; Integrity, Service Delivery, Civic Virtue, Respect for Others; Code of Conduct and Scale of Professional Charges; Professional Responsibilities and Rights; Assessment of Safety and Risks; Formulation of Project Proposal and Outlines, Consultancy Agreements and Contracts; Managerial Aspects; etc.	**5 Hrs.**

Reference Books:	
1.	Reading Material on Project Formulation & Appraisal, by Dr. A. N. Sachithanandan, by Institute of Town Planners, India, New Delhi.
2.	Urban and Regional Planning in India: Handbook for Professional Practice, Kulshrestha, S. K. Sage Publications, New Delhi.
3.	Profession Fee Charges Scale Code Conduct Conditions of Engagement Published by Institute of Town Planners, India, New Delhi.
4.	Urban and Regional Development Plan Formulation Implementation (URPDFI) Guidelines Published by Ministry of Urban Development, Government of India
5.	Professional Ethics & Human Values by Govindarajan, M; Natarajan, G. M. & Senthilkumar, V.S. Published by Prentice Hall, New Delhi.

Housing and Urban Inequality (AEC)								
Credit: 2				Evaluation Scheme (Weightages in %)				
Contact Hours per Week				Theory			Laboratory	
L	T	P	S	MSE	TA	ESE	ISE	ESE
2	0	0	1	30	10	60	--	--

Course Outcomes	
CO1	Students will be able to connect the basics of housing, the significance of housing in National Development Goals and current issues in housing.
CO2	Students will be able to assess housing demand with the help of various types of housing data from various sources, and housing development processes.
CO3	Students will be able to apply the knowledge of standards and design, factors determining residential densities; costs and development control regulations.
CO4	Students will be able to analyze housing policy and programs in India and schemes related to housing for various income groups.

Unit 1: Introduction and Housing Assessment Concepts and Definitions: Shelter as a basic requirement, Census of India definitions, Existing Housing Statistics; definitions; urban and rural housing statistics; Introduction to concepts of Housing Shortage, Housing Need, quantitative and qualitative aspects of housing; Housing Demand - Understanding current methods of demand assessment; Knowledge of data sources and their use and interpretation; census, NSSO and other data; Limitations of existing methods of assessments.	**6 Hrs.**
Unit 2: Housing Growth and Inequality Understanding of factors affecting residential location, theoretical knowledge of ecological, neoclassical, institutional approach to housing; Housing subsystems and their characteristics, Defining urban inequality; Growth of inequality; Global housing issues and inequality; Social inequality in the city: gender, race, and legal exclusions; Economic and Spatial inequality. Formal and non-formal housing; Process of Public and private sector housing development process; policy context, actors and their interrelationships; Inner city housing, Slums, Squatter housing, Unauthorized Housing.	**6 Hrs.**
Unit 3: Housing Standards and Design Factors determining residential densities; Densities, costs and development control regulations; Housing designs parameters and their relationship to costs; Housing design and climate; Measures to resolve inequality in the Housing sector, Housing for disaster prone areas. Communities; its characteristics and housing; socio-economic implication of slums, clearance/ improvement of slum; sites and services schemes, squatter upgrading, incremental approach.	**6 Hrs.**
Unit 4: Housing Policy Understanding and evaluation of Housing Policy and programs in India; five years plans, Central government policy; Policy framework for urban and rural housing; Comparative policy analysis; Housing for the low-income groups; Co-operative housing, objectives and principles; management and financing of housing projects;	**6 Hrs.**

investment in housing in public and private sectors.	

Reference Books:	
1	Housing: Changing Needs and New Directions, V. Gandotra, M. Shukul, N. Jaju and N. Jaiswal, Authors press
2	Housing and Urbanization- A study of India, Cedric Pugh, Sage Publications, New Delhi
3	Housing Laws in India- Problems and Remedies, P. K. Sarkar, Eastern Law House Private Ltd.
4	National Housing Policy, GOI, New Delhi
5	Reading Material on Housing, K. Thomas Poulose, ITPI, India
6	Housing Policies and Related Acts and Schemes of Government of India
7	Housing Finance in India 2004 ICFAI University Press, Hyderabad

Evolution of Indian Architecture and Planning (MDM)								
Credit: 3				Evaluation Scheme (Weightages in %)				
Contact Hours per Week				Theory			Laboratory	
L	T	P	S	MSE	TA	ESE	ISE	ESE
3	0	0	1	30	10	60	--	--

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Course Outcomes:	
CO1	Students will be able to comprehend the historicity of Indian Knowledge System and Understand the broad classification of Indian philosophical systems
CO2	Students will be able to Relate the outline of Heritage and its evolution in Ancient and Medieval India
CO3	Students will be able to appreciate the key role of ancient texts it has played in the advancement of Planning and architecture domain.
CO4	Students will be able to appraise basic elements of the Indian Architecture and Construction and management technique

Unit 1: Fundamentals • Definition of IKS • Unique aspects of IKS • The vedic corpus • Indian philosophical system	**6 Hrs.**
Unit 2: History of Ancient India • Geography of Bharatvarsh and Civilization Journey; • History of India in chronological order	**6 Hrs.**

• Social, Economic & Political Institutions in Ancient India	
Unit 3: Early Historical Cities and Early Text India • Town Planning Principles in Ancient India • Harappan Town Planning • Water Management & Transportation in Ancient India • The text of Mayamata and Mansara	**6 Hrs.**
Unit 4: Indian Temple Architecture • Concept of Sacred and Profane • Techno-Typological Evolution & Regional Variations in Temple Architecture • Rock Cut Architecture • Structural Temple Architecture • Functional Aspects of Temples	**6 Hrs.**
Unit 5: Sacred Ecology • Sacred Forest (Naimisaranya, Panchvati, Dandkaranya etc.), • Sacred Groves (Aaramika, Devkunj, etc.), • Rainwater Harvesting System: Vav, Kund, Talavetc, • Sacred Hills and Mountains (Kailash, Vindhyachal, Sahyadri, Satrunjay, Goverdhan), • Kumbha: assimilation of ritual, myth, symbology, and cosmology	**6 Hrs.**
Unit 6: City Planning after Ancient times • Continuity of Traditional Town Planning of Indian Cities • Jaipur, Madurai, Srirangam	**6 Hrs.**

Reference Books:	
1.	
2.	
3.	
4.	
5.	
6.	

Semester- V

Planning and Design Studio - V (PCC)								
Credit: 4				Evaluation Scheme (Weightages in %)				
Contact Hours per Week				Theory			Laboratory	
L	T	P	S	MSE	TA	ESE	ISE	ESE
0	0	8	0	--	--	--	50	50

Course Outcomes	
CO1:	Students will be able to interpret plan preparation and its relationship of higher order plans with lower order plans, such as Master Plan with Zonal Plans and Area Plans.
CO2:	Students will be able to develop the lower-order plan within the framework of the Master Plan.
CO3:	Students will be able to relate to the bottoms up approach of planning through exploration of community participation.
CO4:	Students will be able to apply the knowledge to devise physical and strategic planning interventions at the local area level.
Prerequisites: Planning and Design Studio - IV	

Course Contents: This Studio focuses on Local Area Planning based on field visits of the chosen study area.

Understanding Planning Hierarchy

The different approaches to plan making are the concepts of master plan, comprehensive development plan - the structure plan, the sector plan, the area/ zonal plan, and their plan-making processes. Relationship of higher order plans with lower order plans, etc.

Framework for Local Area Plans

The bottom-up approach to be operated at the administrative ward level. Approach to developing the area/ zonal plan within the framework of the Master Plan. The study and development of relevant planning standards for different land uses is also carried out, etc.

Local Area Planning

Introduction to aspects of Planning and understanding them in context of a Local Area. Understanding the basis of surveys in analysing the existing situation. Experiment with participation and communication-based action. Development of action areas, Development of strategies and implementation criteria for local-level planning interventions, etc.

Reference Books:

Reference Books:	
1.	Rishi Dev, 2015, Local Area Planning in India, Copal Publishing, ISBN 978-9383419012
2.	Nick Wates, 2014, The Community Planning Handbook: How People Can Shape Their Cities, Towns and Villages in Any Part of the World, Routledge, 978-1844074907
3.	Donal L Elliot, 2008, A Better Way to Zone: Ten 2008 Island Press Washington DC Principles to create More Livable Cities, Island Press Washington DC

Project Formulation Appraisal and Management (PCC)								
Credit: 3				Evaluation Scheme (Weightages in %)				
Contact Hours per Week				Theory			Laboratory	
L	T	P	S	MSE	TA	ESE	ISE	ESE
3	0	0	1	30	10	60	--	--

Course Outcomes	
CO1:	Students will be able to manage Project Formulation and Appraisal.
CO2:	Students will be able to devise Project Planning and Scheduling
CO3:	Students will be able to articulate Project Monitoring
CO4:	Students will be able to Plan Project Resource Management

Unit 1: Defining Project and Project Management Definition of Project and Project Management; Project Formulation: Definition, Objectives; Concept of Projects, Importance of Project Formulation, Appraisal and Management; Reasons for Shortfall in its Performance; Scientific Management, Stages of Project Life Cycle; Causes of Project Delay; Detailed Project Report, and Feasibility Studies; Behavioral Aspects of Project Management; Role of Project Manager; Attributes of a Successful Project Manager; etc.	**6 Hrs.**
Unit 2: Project Formulation and Appraisal Process and Constraints Stages of Project Formulation and their Significance; Methodology for Project Identification and Formulation; Project Feasibility: Types and Components; Project Appraisal: Financial and Economic; Ascertaining Project Costs and Benefits; Financial Appraisal Techniques – Payback Period, Benefit Cost Ratio, Net Present Value, Internal Rate of Return; Discounted Cash Flow, Social Cost Benefit Analysis, etc.	**6 Hrs.**
Unit 3: Project Planning Project Planning Process; Planning for Project Work (Work Breakdown Structure); Planning for Manpower and Organization; Planning for Information System; Breakeven Analysis; Cost Performance / Schedule Performance / Project Performance Index; Cost Overrun; Project Budgeting; Standard Oriented Cost	**6 Hrs.**

Control Techniques; Technoeconomic Analysis of Projects, etc.	
Unit 4: Project Scheduling and Monitoring Project Scheduling: Definition and Steps; Network Techniques in Project Scheduling; Activity on Arc / Node; Forward and Backward Pass; Critical Path and Slack; CPM Simulation; PERT; Gantt Chart; Project implementation, Project Monitoring: Definition and Criteria, etc.; Monitoring Techniques: Integrated Reporting - Milestones, Time and Cost Overrun and Under Runs, Unit Index Techniques, etc.	**6 Hrs.**
Unit 5: Project Resource Management Plan Resource Management-Approach, Organization Chart, Resource Management; Estimate Activity Resources-Type and Quantity Required; Acquiring Resources - Staffing Project Team and Staff Assignments; Developing Team - Training and Development; Managing Team - Performance Review; Control Resources-Managing, Monitoring, Problem Solving, etc.	**6 Hrs.**
Unit 6: Project Evaluations Project Evaluation: Meaning, Objectives, Scope, Stages, Approach and Steps, Life of a Project; Techniques of Project Evaluation: Input Analysis, Financial Cost-Benefit Analysis, Social-Cost Benefit Analysis; Case Studies in Urban and Regional Development Projects, etc.	**6 Hrs.**

Reference Books:	
1.	Manual on Project Formulation by ITTO
2.	Projects by Prassana Chandra. McGraw Hill Publications
3.	Project Management by K. Nagrajan. New Age International Publishers
4.	Project Management by A. Kanda. PHI Learning Pvt. Ltd. 2011
5.	Chandra Prasanna, Projects Planning, Analysis, Selection, Implementation and Review, Tata McGraw Hill Publishing Company Pvt. Ltd., 2003.
6	Brealey Myers, Principles of Corporate Finance, Tata Mc Graw Hill

Planning Legislation-I (PCC)								
Credit: 3				Evaluation Scheme (Weightages in %)				
Contact Hours per Week				Theory			Laboratory	
L	T	P	S	MSE	TA	ESE	ISE	ESE
3	0	0	1	30	10	60	--	--

Course Outcomes	
CO1:	Students will be able to understand the basic Concept of Law.
CO2:	Students will be able to apply for Maharashtra Regional & Town Planning Act-1966
CO3:	Students will be able to apply for Land Acquisition, Rehabilitation and Resettlement

	Act, 2013
CO4:	Students will be able to apply Unified Development Control and Promotion Regulations -2020

Unit-I: Concept of Law Concepts and contents of Indian Constitution, meaning of the term of Law, Legislation, Ordinance, Bill, Act, Regulations and Bye-laws; Significance of Law and its relationship to Planning; evolution of Planning Legislation and overview of legal tools connected with Urban Planning and Development; 73rd and 74th Constitution Amendment Acts; etc.	**6 Hrs.**
Unit-2: Maharashtra Regional & Town Planning Act-1966 Introduction, Relevance with Planning, Section wise Provisions in the Act, Case Studies	**10 Hrs.**
Unit-3: Land Acquisition, Rehabilitation and Resettlement Act, 2013 Introduction, Relevance with Planning, Section wise Provisions in the Act, Case Studies	**10 Hrs.**
Unit-4: Unified Development Control and Promotion Regulations -2020 Introduction, Relevance with Planning, Section wise Provisions in the Regulations, Case Studies	**10 Hrs.**

Reference Books:	
1.	Indian Constitution
2.	Maharashtra Regional & Town Planning Act-1966
3.	Land Acquisition, Rehabilitation and Resettlement Act, 2013
4.	Unified Development Control and Promotion Regulations -2020

Public Policy and Planning (PCC)								
Credit: 3				Evaluation Scheme (Weightages in %)				
Contact Hours per Week				Theory			Laboratory	
L	T	P	S	MSE	TA	ESE	ISE	ESE
3	0	0	1	30	10	60	--	--

Course Outcomes	
CO1:	Students will be able to summarize basic concepts of Public Policy.
CO2:	Students will be able to evaluate the Policy Making Process.

CO3:	Students will be able to analyze the process of transforming policies into the real world.
CO4:	Students will be able to relate Public Policy and Planning.

Unit 1: Definition of Policy and Stages of Policy Making Process Definition, Need for Evolving, Policy for Private Sector and Public Sector, Types of Public Policies, Central-State linkage. Issue and Stakeholders Identification, Setting Agenda, Policy Formulation, Policy Adoption / Legitimization, Implementation, Assessment / Evaluation, Review, Tasks involved in issue identification and Policy Formulation, Policy Making - Organizational, Political and Wider Public Context, etc.	**6 Hrs.**
Unit 2: Attributes of a Good Policy Making Process and Skills of Policy-Makers Up-to-date knowledge of the Subject Matter made available, use of relevant data and Analytical Tools, grouping together related sectors having significant policy interactions, Impact of Policy for one Sector on other Sectors considered, Analysis of trade-offs, Assessment of Winners and Losers from a given Policy, Involving the implementers and those likely affected in Policy Formulation, Independence to Policy Makers. etc.	**6 Hrs.**
Unit 3: Structure of Policy Document and Transforming Policy into Real World Title, description of the problem, proposition of the Preferred Policy, comparative analysis of Policy Options and discussion of their impact, justification of the proposed policy, concluding remarks, reference list, writing guidelines, etc., procedures and guidelines for Policy Implementation, pilot roll-out and validation, tools required, organizational structure, assigning roles, interaction between the policy planners and implementers, capacity building of implementers, etc.	**6 Hrs.**
Unit 4: Policy Monitoring and Policy Review Period of monitoring and persistence, assessment with respect to pre-identified parameters in terms of desired objectives, identifying issues in implementation, simultaneous corrections in procedural aspects, etc., frequency of review, how to measure success / failure, parameters of review, translating review, findings into revision / clubbing / replacement / withdrawal of the policy, some Public Policies (outside Urban Planning) and reasons of success / failure, etc.	**6 Hrs.**
Unit 5: Public Policy Making - Issues and Remedies and Public Policies Related to Urban Planning and Development Issues - excessive fragmentation in thinking and action, excessive overlap between policy making and implementation, lack of non-governmental inputs and informed debate, lack of systematic analysis and integration prior to Policy Making, formulating right policy, and sticking to it, Remedies- reduction in fragmentation,	**6 Hrs.**

segregating policy - making from implementation, decentralizing implementation authority, improving integration and the flow of knowledge from outside Government, improving competence and skills of Policy Making Manpower, study of Policies of Central Govt. and selective State Govts., Housing Policy, Integrated Township Policy, Transit Oriented Development, Change of Land Use-Zone, etc.	
Unit 6: Public Policy and Planning: From development as Economic Growth to Human Development - Indian State and its developmental trajectory, Social Indicators of Development; India's Developmental Strategy - Planning Commission to NITI Aayog, Poverty: Measurement and Alleviation Programmes, Role of Private Sector; Impact of Privatization – Agriculture, Labor, Water; Current Challenges – Urbanization, Technological Dependence, Development and Equity: Regional Imbalances, etc.	**6** **Hrs.**

Reference Books:	
1.	Anderson J.E., (2006) Public Policy-Making: An Introduction, Boston, Houghton
2.	Ashford, Doug (ed.), (1992), History and Context in Comparative Public Policy, Ithaca, NY: University of Pittsburgh Press.
3.	Gerston Larry N., (2004), Public Policy Making: Process and Principles, Armonk, M. E. Sharpe
4.	McCool, Daniel C. (ed.), (1995), Public Policy Theories, Models, and Concepts: An Anthology, NJ: Prentice-Hall
5.	Pal, Leslie A., (1992), Public Policy Analysis: An Introduction, 2nd ed. Toronto: Nelson.
6.	Cities and Public Policy -An Urban Agenda for India by Prasanna K. Mohanty, Sage Publication
7.	George E. Peterson and Patricia C. Annez, Financing Cities 2007 Sage Publishers, World Bank
8.	Public Policy Analysis: An Introduction, 2nd ed. Toronto: Nelson. Xun Wu et.al (2013), The Public Policy Primer, Routledge, London, etc.
9.	The Oxford Handbook of Public Policy, Oxford University Press, New York. Pal, Leslie A., (1992),
10.	Ahluwalia, Isher Judge, Kunbur, Ravi, and Mohanty, P.K., Urbanization in India Challenges, Opportunities and the Way Forward, Sage India, New Delhi, 2014.

Heritage and Conservation of Special Areas (PEC)								
Credit: 3				Evaluation Scheme (Weightages in %)				
Contact Hours per Week				Theory			Laboratory	
L	T	P	S	MSE	TA	ESE	ISE	ESE
3	0	0	1	30	10	60	--	--

Course Outcomes	
CO1:	Students will be able to understand concept of Conservation
CO2:	Students will be able to relate importance of Heritage Areas
CO3:	Students will be able to develop a strategy for Heritage Conservation
CO4:	Students will be able to plan for Conservation of Special Areas

Unit 1: Introduction Overview and Introduction of the basic concepts of Conservation; Values, Attitudes and Principles for Judging the Conservation Importance of Sites, Areas and Related Typology; Scope and basic Technique of Urban Conservation; Heritage Classification, Urban Conservation Act & Regulations, Ancient Monument Act, Urban Renewal as a Part of Development Plan and Development Control Regulations; etc.	**6 Hrs.**
Unit 2: Urban Renewal Concepts Regeneration, Renewal, Revitalization, Rejuvenation, Concepts of Urban Decay, Urban Competitiveness, Social, Economic and Spatial Implications of Conservation and Urban Renewal Programs, Mobilization of Resources; Management of Urban Renewal Areas, Community Involvement, Traffic and Management Issues and Management, etc.	**8 Hrs.**
Unit 3: Tools of Urban Renewal Economic and Spatial Implications of Urban Renewal Programs; Mobilization of Resources; Urban Renewal through Incentive Zoning; Techniques like Redevelopment, Cluster Development, Land Sharing, Land Readjustment and Pooling, Incentive Zoning and Management, Concepts of Adaptive Reuse, Floating FSI And Transfer of Development Rights, etc.	**6 Hrs.**
Unit 4: Characteristics of Special Area Socio-Economic, Physiographic, Geographic and Political Features of Special Areas; Governance Framework of Special Areas; Land Management in Special Areas; Survey of Statutes Governing Special Areas, Unique Infrastructural Needs of Special Areas; Planning Standards for Special Areas, Survey of Programs and Projects for Special Areas; Best Practices of Special Area Planning, etc.	**6 Hrs.**
Unit 5: Classification of Special Areas Need for Special Area Planning; Defining Special Areas; Typology of Formal and Functional Special Areas: Boarder Area, Hill Area, Coastal Area, Desert Area, Extremist Affected Area, Special Economic Zones, Port City, Aerotropolis, Medi-City, Knowledge City, Defiance Area etc.; Contemporary Approaches for Special Area Planning, etc.	**8 Hrs.**
Unit 6: Legal and Administrative Aspects Slum Clearance and Improvement Schemes, Slum Redevelopment Authority	**8**

Regulations, Government Schemes, and their Critical Evaluation; National and International Experience in Implementing Urban Renewal Programs; Legal and Administrative Aspects, National Schemes, Case Studies of Proposals for Urban Conservation of Sites / Areas in India and Abroad Change, etc.	**Hrs.**

Reference Books:	
1.	Luigi Fusco Girard and Peter Nijkamp (editors) Cultural Tourism and Sustainable Local Development (2009) Ashgate, Burlington
2.	The Ancient Monuments and Archaeological Sites and Remains Act 1958 and its amendments.
3.	Cohen, Naoum Urban Planning Conservation and Preservation (2001) McGraw-Hill Publication
4.	Model Heritage Regulations, Ministry of Urban Development, Government of India
5.	Nirmala Rao Khadpekar Urban Revitalization: Perspectives and Initiatives (2008) ICFAI University Press
6.	Richard Longstreth (editor) Cultural Landscapes: Balancing Nature and Heritage in Preservation Practice (2008) University of Minnesota Press
7.	Ismailb Serageldin, Ephim Shluger, Joan Martin-Brown (editors) Historic Cities and Sacred Sites: Cultural Roots for Urban Futures (2001) The World Bank Publication

Landscape and Resource Planning (PEC)								
Credit: 3				Evaluation Scheme (Weightages in %)				
Contact Hours per Week				Theory			Laboratory	
L	T	P	S	MSE	TA	ESE	ISE	ESE
3	0	0	1	30	10	60	--	--

Course Outcomes	
CO1:	Students will be able to understand the concept of Landscape
CO2:	Students will be able to relate Landscape and Urban Planning
CO3:	Students will be able to understand concept of Resource Planning
CO4:	Students will be able to appraise Ecosystem and its Relevance to Environment

Unit 1: Introduction To Landscape Landscape at Urban and Regional Level; Components and Characteristics of Open Space Patterns in Towns and Cities; Landscape Design in Relation io Land- Use, Circulation Networks and Activity; Concepts of Ecosystem Services, Landscape as an Outcome of Natural Processes; Principles and Techniques of Design with Landform, Landscapes in History; etc.	**6 Hrs.**
Unit 2: Elements of Landscape Planning The Rural Landscape: Characteristics, Components and Change Related to	**6**

Agriculture, Forestry and Development; Western Experience of Landscape Planning; Landscape Assessment Techniques; the Concept of Landscape Quality; Landscape Planning as a Component of Regional Development Proposals; Introduction to Landscape Ecology, Cultural Landscapes, etc.	**Hrs.**
Unit 3: Landscape Aspects of Site Planning Principles of Understanding and Evaluating and Existing Landscape; Development as a response to Constraints and Opportunities Offered by the Site; the Landscape Concept and Open Space Structure; Role of Vegetation; Environmental Benefits, Functional Requirements, Aesthetic Considerations; Typical Situations and Criteria for Design with Plants and Selection of Species, Grading; etc.	**6 Hrs.**
Unit 4: Ecosystem and its Relevance to Environment Resources and Human Settlements Impact of Advanced Agricultural Methods, Urbanization, and Industrialization on Nature; Urban Ecosystem Approach Evolution and Significance; Soil, Water, Land, Vegetation and Solar, Biomass, Wind, Hydro Energy Resources; Settlement Planning and Energy Conservation; Development and Management, etc.	**6 Hrs.**
Unit 5: Environmental Policies Global and National Policies on Environment; Five Year Plans in Relation to Environmental Aspects; Legal Measure for Protection of Environment; Environmental Awareness and Education in India; Agencies involved in Environment Protection; Public Participation; Role of Planners in Shaping the Future Environment, etc.	**6 Hrs.**
Unit 6: Quantitative Ecology Introduction to Quantitative Ecology, Identification of Ecological Parameters for Planning at Different Levels; Site Planning, Settlement Planning and Regional Planning; Data Needs and Format for Data Collection; types of Analysis Required to Evolve Ecological Parameters; Planning for Environmentally Sensitive Areas; Environmental Land Use Classification; Environment Impact Studies, etc.	**6 Hrs.**

Reference Books:	
1.	The Landscape of Man: Shaping the Environment from Prehistory to the Present Day - Geoffrey Alan Jellicoe, Susan Jellicoe
2.	Landscape Planning: Environmental Applications - William M. Marsh
3.	Landscape Ecology Principles in Landscape Architecture and Land-Use Planning - Wenche E Dramstad, David M. Gillilan, James D. Olson
4.	Basic elements of landscape architectural design - Norman K. Booth
5	Environment and Ecology – R. K. Agrawal
6	The Planner's Guide to Natural Resource Conservation: The Science of Land Development - Adrian X. Esparza, Guy Mcpherson

Reference Books:	
7	Environmental Studies – Dr. J.P. Sharma
8	Ecology, Environment, and Resource Conservation - J S Singh, S P Singh, S R Gupta

Urban Development (OE)								
Credit: 2				Evaluation Scheme (Weightages in %)				
Contact Hours per Week				Theory			Laboratory	
L	T	P	S	MSE	TA	ESE	ISE	ESE
2	0	0	1	30	20	50	--	--

Course Outcomes:	
CO1	Students will be able to learn about cities as hybrid systems, co-produced and their transformation by socio-cultural, economic, political, technological, and ecological processes
CO2	Students will be able to comprehend affect local, regional, and global impacts of urban areas
CO3	Students will be able to analyze the functions of urban ecosystems and the response of plants and animals to urban environments.
CO4	Students will be able to discuss diverse ways that urban green space and trees contribute to human health and well-being through the provision of ecosystem services.

Unit 1: Introduction to Urban Ecology Components of natural and built environment, Eco-systems and their relevance to environment, resources and human settlements, Modifications in natural environment, causes and consequences. Intro to Urbanization and global change; Development, and Key Principles of urban ecology; urban ecosystem approach, evolution and significance.	**6 Hrs.**
Unit 2: Planning for Urban Built Environment Urban growth and system of cities – scale, complexity; Sustainability and environmental criteria for location of human settlements; planning at different levels - site planning, settlement planning, city planning and regional planning. Abatement measures of Noise, Air and Land pollution; Concept of Green building, Energy conservation and sustainability checklists; Concept of Eco-city; Decay causes and remedies; Urban renewal Missions; Role of Urban planners in Disaster Management. Concept of Smart City	**6 Hrs.**
Unit 3: Policies for Sustainable Development Role and functions of Ministry of Environment and Forests, Coastal Regulatory Plans & Coastal Zone Management Plans, Environment Impact Assessment, Social	**6 Hrs.**

Impact Assessments. Global Trends in Environment Policies, IPCC World Assessment, Coastal Zone Management Plans, Environment Impact Assessment, Social Impact Assessments. Global Trends in Environment Policies, IPCC World Policy, Kyoto Protocol	
Unit 4: Urban Biodiversity and Ecosystem Services Intro to urban biodiversity and ecosystem services. Urban Ecosystem Processes. Urban forestry; challenges and benefits of urban greening, Urban Agriculture, Urban aquatic ecosystems; urban stream syndrome; urban conservation case studies, Urban form, structure, &function Grey to green	**6 Hrs.**
Unit 5: Ecosystem Science and Management Definitions, Technological instrument, Managerial instrument, legal instrument, environmental accounting and management, Environmental accounting and audit, Disaster Management and risk assessment analysis	**6 Hrs.**
Unit 6: Concept of Sustainable Cities Concept of Environmental Audit; Lifecycle Analysis; Carbon- credit; Land-use legacies; structural inequalities; vacant land ecology, Urban ecology and environmental justice; community engagement, Nature-based solutions; urban climate resilience; safe-to-fail infrastructure;	**6 Hrs.**

Reference Books:	
1.	M.C. Dash, (2019) Concepts of Environmental management for sustainable development, Wiley
2.	Richard T. T. Forman, (2014) Urban Ecology: Science of Cities, Cambridge University Press
3.	Robert A. Francis, Michael A. Chadwick (2013), Urban Ecosystems: Understanding the Human Environment, Routledge
4.	Ian Douglas & Philip James (2015), Urban Ecology: An Introduction, Routledge
5.	Environment Studies, JP Sharma, Laxmi Publications
6.	Joy Sen 2013, "Sustainable Urban Planning", TERI (The energy and Resource Institute).

Research Methodology (Technical Report Writing) (RM)								
Credit: 2				Evaluation Scheme (Weightages in %)				
Contact Hours per Week				Theory			Laboratory	
L	T	P	S	MSE	TA	ESE	ISE	ESE
1	1	0	0	CIE: 100				

Course Outcomes	
CO1:	Students will be able to understand Research Methodology
CO2:	Students will be able to identify and define Research Problem
CO3:	Students will be able to design Sampling Methods
CO4:	Students will be able to write scientifically

Unit 1: Introduction and Defining Research Problem Meaning of Research, Objectives of Research, Motivation in Research, Types of Research, Research Approaches, Significance of Research, Research Methods versus Methodology, Research and Scientific Method, Research Process, Criteria of Good Research, Problems Encountered by Researchers in India, Necessity of Defining the Problem, Technique Involved in Defining a Problem, etc.	**6 Hrs.**
Unit 2: Problem Identification and Formulation Research Question - Investigation Question - Measurement Issues - Hypothesis - Qualities of a good Hypothesis- Null Hypothesis and Alternative Hypothesis. Hypothesis Testing, Research Design: Concept and Importance in Research - Features of a Good Research Design, Qualitative and Quantitative Research, Concept of Measurement - Validity and Reliability. Levels of Measurement, etc.	**6 Hrs.**
Unit 3: Sampling, Data Collection, and Analysis: Types and Sources of Data, Methods of Collecting Data, Concept of Sampling and Sampling Methods, Classification and Tabulation of Data, Graphical Representation of data, graphs, and charts – Histograms, frequency polygon and frequency curves, bell shaped curve and its properties, Statistical Methods for Data Analysis: Applications of Statistics in Research, Measures of Central Tendency and Dispersion, etc.	**6 Hrs.**
Unit 4: Scientific Writing Research Report and its Structure, Journal Articles – Components of Journal Article. Explanation of Various Components; Structure of an Abstract and Keywords. Thesis and Dissertations, Components of Thesis and Dissertations; Referencing Styles and Bibliography, Ethics in Research - Plagiarism- Definition, Different Forms, Consequences, Copyright, Infringement, etc.	**6 Hrs.**

Reference Books:	
1.	Business Research Methods- Donald Cooper & Pamela Schindler, TMGH, 9th Editions
2.	Business Research Methods- Alan Bryman & Emma Bell by Oxford University Press
3.	Research Methodology by C. R. Kothari by New Age International (P) Ltd.
4.	Wilkinson & Bhandarkar: Methodology and Techniques of Social Research
5.	Research Methodology (2004), by Panneerselvam, R., by Prentice Hall of India, New

	Delhi
6.	Research Methodology by Michael V. P
7.	Research Methodology (2009) by Ranjit Kumar, 2nd Edition, Pearson Education

Real Estate Management (MDM)								
Credit: 3				Evaluation Scheme (Weightages in %)				
Contact Hours per Week				Theory			Laboratory	
L	T	P	S	MSE	TA	ESE	ISE	ESE
3	0	0	1	30	10	60		

Course Outcomes	
CO1:	Students will be able to understand the concept of Land and Real Estate
CO2:	Students will be able to relate Land Price and Appreciation
CO3:	Students will be able to extract Land Record and Land Tenureship
CO4:	Students will be able to appraise Real Estate Market and its demand

Unit 1: Concept Of Land and Real Estate Economic Concepts of Land, Objectives and Scope of Land Economics; Relevance for Spatial Planning; Economic Principles of Land Uses; Definition and Concept of Real Estate, History of Development in Real Estate Property and Land Development Process in India and its trend; Prospect of Real Estate Business and Nature of Services in India; etc.	**6 Hrs.**
Unit 2: Land Record and Information Systems Land Record and Information Systems – Survey and Mapping; Record and Bookkeeping – Presentation of Records – Methods of Revenue Land Survey of Settlement as part of the Settlement Record – Registration Act and Procedures – Different Book Volumes and its Reference Under Registration Act; etc.	**6 Hrs.**
Unit 3: Land Price and Appreciations Factors that Govern Land Price, Appreciation from Rural Agriculture Land to Urban Residential Plot – Process of Calculation Land Development, Cost Items Considered for Estimating Cost to find out Appreciation Value of the Parcel of Plot, etc. Real Estate Development Services; Financial Feasibility Analysis of Real Estate Business and the Project Level Feasibility Analysis; etc.	**6 Hrs.**
Unit 4: Real Estate Market and its Situation Analysis Conducting Market Survey, Content of the Market Survey, items that should be Addressed in the Market Survey; Market Survey for Overall Real Estate Business as Prospect and Market Survey for Specific Projects, Characterizing the Market-Preferences Location, Types of Property, Amenities, Size and Spaces-	**6 Hrs.**

Categorization of Flexibility of Choice in Property Market, etc.	
Unit 5: Land Tenureship Various Kinds of Legal and Non-Formal Land Tenureship – Marketability of Property under different kind of Tenure Status - different Acts and its Rules applied to Property Sale and Transfer Procedures; Informal and Non-Formal Land Tenure Ship; Various Nature of Tenure Relationships that exists in Slums and Squatter; Conditions under which Land become Available to The Urban for Shelter, etc. –.	**6 Hrs.**
Unit 6: Demand Assessment of Real Estate Method of Estimating and Forecasting Demand for Residential Property under Different Category and Various Segments in the Property Market; Criteria for Assessing Commercial Property. Evaluating Sties for Commercial Activities; Concepts of "Area Sales Activities", "Level of Competition", "Trade Area Analysis", "Catchment Area Analysis" and "Regression Analysis", etc.	**6 Hrs.**

Reference Books:	
1.	Urban Planning and Real Estate Development by John Ratcliff, et.al, Routledge Publications
2.	Principles of Real Estate by Arthur Weimer et.al. The Ronald Press company, NY
3.	Evans, A. W. (1995), The Property Market, Ninety Percent Efficient? Urban Studies, 32, No. 1 pp 5 – 29.
4.	Numan J. (2000), Mumbai's Real Estate Market in 1990s De-regulation, global money and casino capitalism, Economic and Political Weekly, February 12, pp 575 - 582.
5	Telang Prashant, Importing Land Management, Indian Architects and Builders, April 1996, pp 45 – 48
6	Construction World (1999), Land Factor, Rea Estate, Construction World, December 1999, pp 29 – 31
7	Ishikawa, T. and Tado, M. (2000), Some Economic Extension of Central-Place Theory Involving Profit Maximization, Urban Studies, 37, No. 3, pp 481 – 495

Semester-VI

Planning and Design Studio - VI (PCC)								
Credit: 4				Evaluation Scheme (Weightages in %)				
Contact Hours per Week				Theory			Laboratory	
L	T	P	S	MSE	TA	ESE	ISE	ESE
0	0	8	0	--	--	--	50	50

Course Outcomes	
CO1:	Students will be able to understand the contents, substance, and characteristics of various development plans for predominantly urban settlements.
CO2:	Students will be able to comprehend the processes of plan preparation and data-based analysis techniques for the identification of issues and potentials for an urban settlement through collaborative teamwork
CO3:	Students will be able to apply knowledge in various aspects of planning urban areas about the national vision and demands of the society.
CO4:	Students will be able to evolve development policies, development control rules and regulations, and land use plan and devise implementation mechanisms for a selected urban area
Prerequisites: Planning and Design Studio - V	

Course contents: The focus is on the preparation of a development plan for an urban settlement based on a field visit to the chosen study area.

Studying Development Plans The study shall involve understanding of contents of various types of development plans and exploring their focus areas, studying the legal and policy background of development plans in an international context and focusing on Indian context
Generating Existing Scenario based on Data Input Identification of the data to be collected and the sources thereof, preparation of a collection of secondary source information of the towns or cities selected for the study, organising surveys, collection of primary and secondary data and information on various aspects such as demography, social, economic, housing, transportation, etc.; conduct of primary and secondary surveys
Analysis and Synthesis Analysis and synthesis of data and information collected on various aspects; projections of population and workforce; trends and issues identification.
Plan, Policies and Proposals Preparation of policies and proposals with different scenarios and identification of

priorities and action areas; phasing and monitoring; governance structures for implementation; land use plan and the plan document

Reference Books:	
1.	Ministry of Urban Development ,2015, The Urban and Regional Development Plan Formulation and Implementation (URDPFI) Guidelines, Government of India, New Delhi.
2.	Government of Maharashtra, 2020, Unified Development Control and Promotion Regulations for Maharashtra state.
3.	B. K. Pattanaik, 2016, Introduction to Urban Development and Planning, Sage Publication, ISBN:978-93-5388-322-5(PB)
4.	N. Mani, 2012, Infrastructure Development and Financing in India, New Century Publications, New Delhi, ISBN: 978-8177083095

Land and Building Valuation (PCC)								
Credit: 3				Evaluation Scheme (Weightages in %)				
Contact Hours per Week				Theory			Laboratory	
L	T	P	S	MSE	TA	ESE	ISE	ESE
2	0	2	0	30	10	60	--	--

Course Outcomes	
CO1:	Students will be able to learn Science and Art of Valuation
CO2:	Students will be able to analyze Land and Building Market.
CO3:	Students will be able to apply various Valuation Approaches and Methods
CO4:	Students will be able to learn about various Land Related Legal Provisions.

Unit-I: Definition and Scope of Valuation Science and Arts of Valuation; Scope of Valuation and its importance in Planning; Eminent Domain; Defining Value – Use Value and Exchange Value; Different Kinds of Value; Different types of Rents; Definition of Terms - Gross Income, Net Income, Sinking Fund, Year's Purchase, Depreciation, Obsolescence, Amortization, Annuity, Capitalized Value, Land Locked Land, Return and Double Frontage, Adverse Possession, etc.; Purpose of Valuation; Valuation Process; etc.	**6 Hrs.**
Unit-2: Real Estate – Concept and Context Real Estate - Asset and Property, Intangible and Tangible Asset, Overview of Real Estate Valuation; Characteristics of Landed Property, Real Estate Market, Bundle of Property Rights; Types of Interest and Rights in the Property – Freehold Interest, Lease Hold Interest, Easement Rights, Life, Fee Tail, Fee Simple Estate; Transfer of Interest and Right in Property; Right to Property - Acquisition subject to Payment of	**6 Hrs.**

Amount, Acquisition subject to Payment of Compensation, Constitution 44th Amendment Act, 1978;	
Unit-3: Valuation Approaches and Methods Real Estate Market Mechanism; Principles of Comparable Evidence; Bases of Value; Principal Valuation Approaches; Bases other than Market Value; Market Approach- Heterogeneity and Multiplicity of Principle Real Estate features; Ranking and Evaluation Grid; Belting Method of Valuation; Elements of Investment Market and Real Estate – Real Estate as an Investment, Capital Market, Principles of "Yield", Construction and Use of Valuation Tables; etc.	**6 Hrs.**
Unit-4: Other Valuation Approaches and Methods The Income Approach – Perpetual Income Flow, Outgoing, Market Rent, Effect of Demand and Supply on Rent, etc.; The Cost Approach – Reproduction verses Replacement Cost, Replacement Cost Method, Reproduction Cost Method, Contractor's Method of Valuation, Depreciation, Application of Cost Approach, Account Method, etc.; Discounted Cash Flow Techniques; Developed Property – Trade Related Property, Valuation based on Profit; etc.	**6 Hrs.**
Unit-5: Indirect Methods of Valuation Travell Cost Method to Estimate Economic Use Values Associated with Ecosystems or Sites that are used for Recreation; Contingent Valuation for the Valuation of Non-Market Resources, such as Environmental Preservation or the Impact of Contamination; Hedonic Pricing Method to Estimate Economic Values for Ecosystem or Environmental Services that Directly Affect Market Prices; etc.	**6 Hrs.**
Unit-6: Land Related Act Registration Act, 1908, Annual Statement Rate (ASR), Maharashtra Land Record Code 1966, Urban Land (Ceiling and Regulation) Act (ULCRA) of 1976, Maharashtra Rent Control Act, 1999; Maharashtra Apartment Ownership Act, 1970; Societies Registration Act, 1860; Real Estate (Regulation and Development) Act 2016; Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013; etc.	**68 Hrs.**

Reference Books:	
1.	J. A. Parks Principles and Practice of Valuation Edited by D. N. Banerjee Published by Eastern Law House
2.	Theory and Practice of Valuation by Roshan Namavati Published by Lakhani Book Depot
3.	Mastering Real Estate Valuation by Syamales Datta Published by Syamales Datta
4.	Valuation of Real Properties by S. C. Rangwala, Published by Charotar Publishing House
5.	Basics in Real Estate Valuation by P. T. Hardikar, Published by P. T. Hardikar

Reference Books:	
6.	Writing a Report – Rea Estate Valuation by P. T. Hardikar, Published y Sejal Nelson Macwan, Anand, Gujrat

Planning Legislation-II (PCC)								
Credit: 2				Evaluation Scheme (Weightages in %)				
Contact Hours per Week				Theory			Laboratory	
L	T	P	S	MSE	TA	ESE	ISE	ESE
2	0	0	1	30	10	60	--	--

Course Outcomes	
CO1:	Students will be able to apply Maharashtra Land Revenue Code, 1966
CO2:	Students will be able to apply Maharashtra Slum Areas (Improvement, Clearance and Redevelopment) Act, 1971 and DCR for SRA Pune and Pimpri Chinchwad
CO3:	Students will be able to apply Maharashtra Area and Housing Development Act-1976
CO4:	Students will be able to apply Maharashtra Industrial Development Act-1971 and Real Estate (Regulation and Development) Act, 2016

Unit-I: Maharashtra Land Revenue Code, 1966 Introduction, Relevance with Planning, Section wise Provisions in the Act, Case Studies	**6 Hrs.**
Unit-2: Maharashtra Slum Areas (Improvement, Clearance and Redevelopment) Act, 1971 and DCR for SRA Pune and Pimpri-Chinchwad Introduction, Relevance with Planning, Section wise Provisions in the Act, Case Studies	**6 Hrs.**
Unit-3: Maharashtra Area and Housing Development Act-1976 Introduction, Relevance with Planning, Section wise Provisions in the Act, Case Studies	**6 Hrs.**
Unit-4: Maharashtra Industrial Development Act-1971 Introduction, Relevance with Planning, Section wise Provisions in the Act, Case Studies	**6 Hrs.**
Unit-5: Real Estate (Regulation and Development) Act, 2016	**6**

Introduction, Relevance with Planning, Section wise Provisions in the Act, Case Studies	**Hrs.**

Reference Books:	
1.	The Maharashtra Land Revenue Code, 1966
2.	The Maharashtra Slum Areas (Improvement, Clearance and Redevelopment) Act, 1971
3.	Development Control Regulations for Slum Rehabilitation Authority- Pune and Pimpri-Chinchwad
4.	The Maharashtra Area and Housing Development Act-1976
5	The Maharashtra Industrial Development Act-1971 and
6	Real Estate (Regulation and Development) Act, 2016

Sustainable Urban Development (PCC)								
Credit: 3				Evaluation Scheme (Weightages in %)				
Contact Hours per Week				Theory			Laboratory	
L	T	P	S	MSE	TA	ESE	ISE	ESE
3	0	0	1	30	10	60	--	--

Course Outcomes	
CO1:	Students will be able to relate the concept of Sustainable Urban Development.
CO2:	Students will be able to interpret Ecosystem and Sustainability
CO3:	Students will be able to construct Frameworks of Sustainability
CO4:	Students will be able to prioritize Critical Perspectives on Sustainable Development

Unit 1: Introduction to Sustainable Development Definitions, Concepts and Parameters in Sustainable Development with Particular Reference to Brundt Land Commission (SDG), Later UN Summits (Rio Summit, etc.) and Outcome; Sustainable Urban Development Goals, Agenda 21, Eco-City Approach, etc.; Regulatory and Policy Regime; Changing Perspectives in Man-Environment Relationship with Focus on Issues of Population, Urbanization, Resource Depletion and Pollution; etc.	**6 Hrs.**
Unit 2: Ecosystem and Sustainability: Fundamentals of Ecology - Types of Ecosystems and Interrelationships, Factors Influencing Sustainability of Ecosystems, Ecosystem Restoration - Developmental Needs; Introduction to Sustainability and its Factors; Requirements for Sustainability: Food Security and Agriculture; Renewable Resources - Water and Energy, Non-Renewable Resources, Factors and Trade-Offs; Sustainability Conflicts; a Conceptual Framework for Linking Sustainable Development, etc.	**6 Hrs.**

Unit 3: Dimensions to Sustainable Development Society, Environment, Culture and Economy; Current Challenges - Natural, Political, Socio-Economic Imbalance; Sustainable Development Initiatives and Policies of Various Countries: Global, Regional, National, Local; Needs of Present and Future Generation - Political, Economic, Environmental, etc.	**6 Hrs.**
Unit 4: Gauging Sustainable Development Sustainability and Development Indicators and SDGs, UN's Outlook of Sustainable Development and Efforts, UN SDGs - Structure, Governance and Partnerships; Communities / Society: Ensuring Resilience and Primary Needs in Society; Biosphere: Development Within Planetary Boundaries; Strengthening Institutions for Sustainability; Shaping a Sustainable Economy, etc.	**6 Hrs.**
Unit 5: Frameworks of Sustainability Analytical Frameworks in Sustainability Studies, Sustainability Metrics: Criteria and Indicators; the Significance of Quantitative and Qualitative Assessments of Sustainability; Current Metrics and Limitations; Metrics for Mapping and Measuring Sustainable Development; Application of the Metrics in Real Scenarios, etc.	**6 Hrs.**
Unit 6: Critical Perspectives on Sustainable Development Resource Management and Implications on Sustainable Development - Implications for Valuation, Risk Assessment; Integrated Decision-Making Processes: Requirements of Information, Information Flow, Data Analytics, Learning from Historical Data, Multicriteria Decisions, Multi-Level Decisions, Participatory Decisions; Translating Impact Chains to Information Flows - Impact of Governance and Policies, etc.	**6 Hrs.**

Reference Books:

1.	Handbook on Urban Sustainability by Munier, Nolberto. Springer 2007
2.	Climate Resilient and Sustainable Urban Development, The Energy and Resource Institute. TERI 2011
3.	Shanghai Manual, A Guide for Sustainable Urban Development of the 21st Century, Union Nations 2010
4.	Rogers, Peter P., Kazi F. Jalal, and John A. Boyd. "An introduction to sustainable development." (2012).
5.	Sachs, J. D. 2015. The Age of Sustainable Development. Columbia University Press, New York.
6.	Elliott, Jennifer. 2012. An Introduction to Sustainable Development. 4th Ed. Routledge, London.
7.	Our Common Journey: A Transition Toward Sustainability. National Academy Press, Washington D.C. Soubbotina, T. P. 2004.

Urban Design and Place Making (PEC)								
Credit: 3				Evaluation Scheme (Weightages in %)				
Contact Hours per Week				Theory			Laboratory	
L	T	P	S	MSE	TA	ESE	ISE	ESE
3	0	0	1	30	10	60	--	--

Course Outcomes	
CO1:	Students will be able to understand the concept of Urban Design
CO2:	Students will be able to relate Urban Design and Urban Form
CO3:	Students will be able to understand concept of Place Making
CO4:	Students will be able to appraise Urban Planning and Place Making

Unit 1: Introduction to Urban Design Definition of Urban Design, Urban Design as Interface between Architecture and Planning; City as a Three-Dimensional Entity; Activity and the morphology of places; Study of Volumes and Open Spaces at all Spatial Levels; Form, Size and Structure of Cities; A brief Historic Review of the Development of the Urban Design Discipline and Principles, etc.	**6 Hrs.**
Unit 2: Elements of Urban Design Urban Form as Determined by Inter-Play of Masses, Voids, Building Typology; Scale, Harmony, Symmetry, Colour, Texture, Light and Shade; Dominance, Height, Urban Signage and Graphics; Organization of Spaces and their Articulation in the Form of Squares, Streets, Vistas and Focal Point; Image of the City and its Components; Urban Transportation, etc.	**6 Hrs.**
Unit 3: Urban Form and its Control Tangible and Intangible Aspects of City Design; Universal Values of Urban Design; an overview of Urban Design Theories; Public Realm of Cities; Urban Form Determinants; Urban Design and its Control; Urban Design and its Control; Control of Visual Pollution; Agencies Responsible for ensuring better Urban Design - their Roles, Powers and Limitations, etc.	**6 Hrs.**
Unit 4: Introduction to Place Making Concept of Place Making, Criticisms of Modern Planning and Design, Concepts of Space and Place, Understanding Place and Identity, Concept of Genius Loci, Urban Design as Place Making, Dichotomies in Urban Design, Histories of Place - Social, Cultural and Political Histories of Idea of Place and its Design; Public Space and Place, Street as Public Space, etc.	**6 Hrs.**
Unit 5: Aspects of Place Making Tangibles and Intangible Aspects of Place, Place - Drawing Ideas from Arts,	**6 Hrs.**

Literature and other Medias, Public Space in India- Ideas and Concepts, Urban Narratives, Place Making Principles, Economics of 'Place', Role of Urban Design in Shaping Urban Place and Space, Development Plans and Urban Form, Qualitative Surveys and Aspects of Place Making, etc.	
Unit 6: Communicative Design The Deliberation Process, Roles of Arts and Culture in Urban Development, Participatory Design, Co-Design, Urban Design and Place Making as Evolving Process, Interface of Urban Design Discipline with Landscape, Transport, Conservation, Management, Climate Change and Urban Form, Urban Sustainability Issues, Technological Advancement and Urban Design-Place Making.	**6 Hrs.**

Reference Books:	
1.	Urban Design, 2005 Edition by John Lang, Elsevier Publication
2.	Image of the City 2009 Edition by Kevin Lynch by Minnesota Press
3.	Urban Design - The Composition of Complexity, 2011 Edition, by Ron Kesprisin by Routledge, New York
4.	Doing Research in Design 2012 Edition by Cristopher Crouch and Jane Pearce by Berg, New York
5	Edmund Bacon, Design of Cities, Thames and Hudson, London 1967
6	Kostof, Spiro (1999), The City Assembled: The Elements of Urban Form through History Thames and Hudson
7	Gordon Cullen, The Concise Townscape, Van Nostrand, Reinhold Co, 1961
8	Short, J. R., (1996). The Urban Order: Introduction to Cities, Culture, and Power. John Wiley & Sons

Participatory and Inclusive Planning (PEC)								
Credit: 3				Evaluation Scheme (Weightages in %)				
Contact Hours per Week				Theory			Laboratory	
L	T	P	S	MSE	TA	ESE	ISE	ESE
3	0	0	1	30	10	60	--	--

Course Outcomes	
CO1:	Students will be able to understand the concept of Inclusive Planning
CO2:	Students will be able to relate the role of Stakeholders in Inclusive Planning
CO3:	Students will be able to appraise the role of Informal Sector in development
CO4:	Students will be able to design Participatory Approach of development

Unit 1: Urban Poverty	**6**

Dimensions of Urban Poverty, Magnitude of Problem, Urban Poverty Alleviation Programs, Impact of Macro-Economic Structural Adjustment Policies on Poor Urban Households. Basic Needs: Development of the Concept of Basic Needs; Identification of Basic Needs and their Provision for Various Target Groups and Informal Sectors; Standards for Basic Needs, etc.	**Hrs.**
Unit 2: Stakeholders Profile Urban Poor, Informal Sector, Gender, Children, Elderly, Disabled, Displaced People, etc.; Slums - Dimensions, Causative Factors, Determinants, Location Characteristics of Settlements; Informal Sector - Growth, Characteristics, Functions, Economic Contributions, Linkages with Formal Sector, Impact on Urban Development; etc.	**6 Hrs.**
Unit 3: Migratory Impulses and Impact on Informal Sector Characteristics of Migrants and their Association with Growth of Informal Sector; Socio-Economic Deprivation and Informal Sector; Development of Informal Sector Concept; Role of Informal Sector in Housing Stock, Economy, Commercial Activities, etc.; Implications in Physical Planning, etc.	**6 Hrs.**
Unit 4: Consequences of Spontaneous Growth Study of Major Aspects; Spontaneous Living and Working, their Characteristics and Functions in Urban Context, Actions for Improvement; Appraisal of the Role of Government, Private and Voluntary Organizations; Existing Management; Their Organizational Set-Up and Limitations; Planning and Development of Urban Settlements in Respect of Spontaneous Growth; etc.	**6 Hrs.**
Unit 5: Delivery of Basic Services to Urban Poor Community Planning Approach, Low-Cost Alternatives, Institutional Reforms Approach, Inclusive Zoning, Development and Building Regulations, System, Structure, Functions, Powers, Process and Resource, Performance, Interface with NGO's, CBOs and other Local, State, National and International Organizations, role of elected representatives in participatory processes; etc.	**6 Hrs.**
Unit 6: Participatory Planning Process Participatory Planning: History and Significance, Understanding Participatory Processes; Methods of Participation; Institutional Arrangement for Public Participation Methods; Techniques of Participation; Stakeholders' Participation, Roles, and Responsibilities (Including Civil Society Organizations), etc., Access to Government by Various Stakeholders, methods of communication, etc.	**6 Hrs.**

Reference Books:	
1.	Informal sector in Indian Economy by Dipa Mukherjee, Rawat Publications, 2009
2.	Revisiting the Informal Sector by Sarabjit Chauhan and Ujjani Mukhopadhyay, Springer Publications, 2010

Reference Books:	
3.	A General Equilibrium Approach, Informal Sector Concept, Dynamics Linkages and Migration by Kishor C. Samal, Concept Publishing Company, New Delhi, 2008
4.	Forester, J. (1999) The Deliberative Practitioner: Encouraging Participatory Planning Processes, MIT Press, Massachusetts.
5	Inclusive Planning and Social Infrastructure by A. K. Jain

Urban Data Analytics and Simulation (VSEC)								
Credit: 2				Evaluation Scheme (Weightages in %)				
Contact Hours per Week				Theory			Laboratory	
L	T	P	S	MSE	TA	ESE	ISE	ESE
1	0	2	0	30	10	60	CIE: 100	

Course Outcomes	
CO1:	Students will be able to understand importance of Urban Date
CO2:	Students will be able to articulate Mapping the City
CO3:	Students will be able to correlate Data Science for Planners
CO4:	Students will be able to devise Simulation Model

Unit 1: Introduction to Urban Data Introduction to Fundamental Data Applications and Ethical Dilemmas in Urban Planning, Data Sourcing, Analyzing Data Via Statistical Testing, and Presenting Data through Written Reports and Visualizations, Census and Economic Data, Statistical Testing, and Static Data Visualization, etc.	6 Hrs.
Unit 2: Mapping The City Different Tools to Make Maps, Understanding of Basic Elements of Maps, How to Map with Online Programs and Geographic Information Systems Software (Carto), and How to Construct Story, Map Websites, etc.	6 Hrs.
Unit 3: Data Science for Planners - Big Data and Analytics Explore Urban Data Science Techniques - Big Data, Open Data, Volunteered Geographic Information, Smart Cities, and Civic Hacking; Real-Time and Crowd-Sourced Data Collection and its Use; etc.	6 Hrs.
Unit 4: Data Simulation Simulation, Projecting Growth / Development, Data Simulation, Data Interpolation, Managing Risk, Data Science and Research, Type of Simulation Model - Monte Carlo Method, Agent-Based Modeling, Discrete Event Simulation, System Dynamic Modeling, etc.	6 Hrs.

Reference Books:	
1.	Brewer, Cynthia A. (2015). Designing Better Maps: A Guide for GIS Users. Second Edition, Redlands, California: Esri Press. ISBN: 978-1-58948-440-5.
2.	Few, Stephen (2015). Signal: Understanding What Matters in a World of Noise. Burlingame, California: Analytics Press. ISBN: 978-1-938377-05-1.
3.	Tufte, E. R (2001). The Visual Display of Quantitative Information. Cheshire, CT: Graphics Press.
4.	Wickham, Hadley (2016). Ggplot2: Elegant Graphics for Data Analysis. Springer-Verlag New York. ISBN: 978-3-319-24277-4. URL: https://ggplot2.tidyverse.org.
5.	Bivand, Roger S., Edzer Pebesma, and Virgilio GÃƒÂ³mez-Rubio (2013). Applied Spatial Data Analysis with R. 2nd ed. 2013 edition. New York Heidelberg Dordrecht London: Springer. ISBN: 978-1-4614-7617-7.
6.	Townsend, Anthony M. 2013. Smart Cities: Big Data, Civic Hackers, and the Quest for a New Utopia. W. W. Norton & Company.
7.	Wheelan, Charles. 2013. Naked Statistics: Stripping the Dread from the Data. W. W. Norton & Company.
8.	Schwabish, Jonathan.2017. Better Presentations: A guide for Scholars, Researchers, and Wonks. Columbia University Press.

Smart Cities (MDM)								
Credit: 4				Evaluation Scheme (Weightages in %)				
Contact Hours per Week				Theory			Laboratory	
L	T	P	S	MSE	TA	ESE	ISE	ESE
4	0	0	1	30	10	60	--	--

Course Outcomes	
CO1:	Students will be able to understand the concept of Smart City
CO2:	Students will be able to examine challenges and opportunities in the development of Smart Cities
CO3:	Students will be able to plan and develop Smart Cities
CO4:	Students will be able to design Smart Infrastructure for cities

Unit 1: Introduction and Fundamentals of Smart City Introduction of Smart City, Fundamental of Smart City, Concept of Smart City, Objective for Smart Cities; History of Smart City - World and India; Need to Develop Smart City; the Evolution of Cities up to the Present Day; Urbanization and its Impacts on Cities; Urban Evolution in India, Changing Patterns of Urban Growth, Quality of Life in the City, etc.	**6 Hrs.**
Unit 2: Planning and Development of Smart Cities	**6**

Efficiencies and Inefficiencies in Cities; Challenges and Opportunities, Eco Challenges in the Contemporary Cities; Principles of Green and Smart Cities; International Initiatives Including UN and EU Level; Worldwide Policies for Smart City Government of India - Policy for Smart City, Mission Statement and Guidelines, Smart Cities in India, etc.	**Hrs.**
Unit 3: Fundamentals of Sustainable Development Fundamentals of Sustainable Development; Sustainability and "Sustainable Development, Climate Change Indicators, and their Meaning for Cities; Mobility and Transportation within Urban Areas; Green Technologies in Cities; Green Buildings and Ecological Footprint, Green Infrastructure, Urban Sustainability Foundations, Models and Theories, etc.	**6 Hrs.**
Unit 4: Governance of Smart Cities Role of Local Authorities and Public Participation in Shaping the Cities; Smart People, Smart Environment, Smart Living, Impact of ICT on the Social Fabric, Place Making and Walkability; City Wide Network; Wireless Networks; IoT and Smart City; Blockchain, E-Government and Smart City; Artificial Intelligence (AI) Analysis & AI Decision Support System, Alternate Reality, Virtual Reality, etc.	**6 Hrs.**
Unit 5: Management of Smart Cities Study of the Existing Cities, Finding Problems and Designing for Smart Cities, Development and Exhibition of a Feasible Innovation Project; Determining the Scope, Defining the Idea, Establishing Objectives, Identifying Partners, Selecting and Acquiring Tools and Knowledge, Planning and Presentation, Infrastructure Management System and Policy for Smart City, etc.	**6 Hrs.**
Unit 6: Smart Infrastructure Energy and Ecology, Solar Energy for Smart City, Smart Housing, Safety, Security, Disaster Management, Economy, Cyber Security, Project Management; Intelligent Transport Systems - Smart Vehicles and Fuels, GIS, GPS, Navigation System, Traffic Safety Management, Mobility Services, city Integrated Infrastructure Management Systems for Smart City, etc.	**6 Hrs.**

Reference Books:	
1.	How Green is Cities? By Dimitri Devuyst, Colombia University Press, New York
2.	Smart City on Future Life - Scientific Planning and Construction by Xianyi Li
3.	The Age of Intelligent Cities: Smart Environments and Innovation-for-all Strategies (Regions and Cities) by Nicos Komninos
4.	Smart Cities: Big Data, Civic Hackers, and the Quest for a New Utopia by Anthony Townsend
5	Giffinger, Rudolf; Christian Fertner; Hans Kramar; Robert Kalasek; Nataša Pichler-Milanovic; Evert Meijers (2007). "Smart cities – Ranking of European medium-sized cities". Smart Cities. Vienna: Centre of Regional Science

Reference Books:	
6	Hudson W.R., Haas R., Uddin W., Infrastructure Management, McGraw-Hill, 1997
7	Mission statement &guidelines on Smart City Scheme". Government of India - Ministry of Urban Development http://smartcities.gov.in/upload/uploadfiles/files/Smart City Guidelines (1).pdf